

RC  
1042  
.L66  
1993g

Department  
Transportation  
National Highway  
Traffic Safety  
Administration

---

DOT HS 808 231

June 1993

Final Report

# **Final Report of a 1990 Ford Taurus into Heavy Truck Rigid Rear Underride Guard in Support of CRASH3 Damage Algorithm Reformulation**

## NOTICE

Transportation Research Center Inc. does not endorse or certify products of manufacturers. The manufacturer's name appears solely to identify the test article. Transportation Research Center Inc. assumes no liability for the report or use thereof. It is responsible for the facts and the accuracy of the data presented herein. This report does not constitute a standard, specification, or regulation.

This publication is distributed by the U. S. Department of Transportation, National Highway Traffic Safety Administration, in the interest of information exchange. The opinions, findings and conclusions expressed in this publication are those of the author(s) and not necessarily those of the Department of Transportation or the National Highway Traffic Safety Administration. The United States Government assumes no liability for its contents or use thereof. If trade or manufacturers' names or products are mentioned, it is only because they are considered essential to the object of the publication and should not be construed as an endorsement. The United States Government does not endorse products or manufacturers.

1. Report No. DOT HS 308 231	2. Government Accession No.	3. Recipient's Catalog No.																					
4. Title and Subtitle FINAL REPORT OF A 1990 FORD TAURUS INTO HEAVY TRUCK RIGID REAR UNDERRIDE GUARD IN SUPPORT OF CRASH3 DAMAGE ALGORITHM REFORMULATION		5. Report Date JUNE 1993	6. Performing Organization Code																				
7. Author(s) K. W. Looker, Project Engineer, TRC		8. Performing Organization Report No. 930603																					
9. Performing Organization Name and Address National Highway Traffic Safety Admin. Vehicle Research and Test Center P. O. Box 37 East Liberty, OH 43319		10. Work Unit No. (TRAIS)	11. Contract or Grant No. DTNH22-88-C-07292																				
12. Sponsoring Agency Name and Address U. S. Department of Transportation National Highway Traffic Safety Administration 400 Seventh St., S.W. Washington, DC 20590		13. Type of Report and Period Covered FINAL REPORT JUNE - JULY 1993																					
15. Supplemental Notes		14. Sponsoring agency Code DOT/NHTSA/VRTC																					
16. Abstract <p>Four (4) heavy truck rigid rear underride guard impact tests were conducted for research and development in support of the CRASH3 damage algorithm reformulation. These tests were conducted on a 1990 Ford Taurus 4-door sedan, VIN 1FABP50U7KG277510 at Transportation Research Center Inc. on June 3, 1993. The following four tests were conducted on the vehicle:</p> <table border="1"> <thead> <tr> <th>TEST NO.</th> <th>DATE</th> <th>TIME</th> <th>SPEED (MPH)</th> </tr> </thead> <tbody> <tr> <td>930603-1</td> <td>06/03/93</td> <td>1142</td> <td>10.0</td> </tr> <tr> <td>930603-2</td> <td>06/03/93</td> <td>1344</td> <td>15.0</td> </tr> <tr> <td>930603-3</td> <td>06/03/93</td> <td>1512</td> <td>15.0</td> </tr> <tr> <td>930603-4</td> <td>06/03/93</td> <td>1711</td> <td>34.7</td> </tr> </tbody> </table>				TEST NO.	DATE	TIME	SPEED (MPH)	930603-1	06/03/93	1142	10.0	930603-2	06/03/93	1344	15.0	930603-3	06/03/93	1512	15.0	930603-4	06/03/93	1711	34.7
TEST NO.	DATE	TIME	SPEED (MPH)																				
930603-1	06/03/93	1142	10.0																				
930603-2	06/03/93	1344	15.0																				
930603-3	06/03/93	1512	15.0																				
930603-4	06/03/93	1711	34.7																				
17. Key Words Heavy Truck Rigid Rear Underride Guard CRASH3 Damage Algorithm Reformulation		18. Distribution Statement Document is available to the public through the National Technical Information Service Springfield, Virginia 22161																					
19. Security Classif. (of this report) UNCLASSIFIED	20. Security Classif. (of this page) UNCLASSIFIED	21. No. of Pages 212	22. Price																				

# METRIC CONVERSION FACTORS

## Approximate Conversions to Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol
<b>LENGTH</b>				
in	inches	2.5	centimeters	cm
ft	feet	30	centimeters	cm
yd	yards	0.9	meters	m
mi	miles	1.6	kilometers	km
<b>AREA</b>				
m <sup>2</sup>	square inches	6.5	square centimeters	cm <sup>2</sup>
ft <sup>2</sup>	square feet	0.09	square meters	m <sup>2</sup>
yd <sup>2</sup>	square yards	0.8	square meters	m <sup>2</sup>
mi <sup>2</sup>	square miles	2.6	square kilometers	km <sup>2</sup>
	acres	0.4	hectares	ha
<b>MASS (weight)</b>				
oz	ounces	28	grams	g
lb	pounds	0.45	kilograms	kg
	short tons (2000 lb)	0.9	tonnes	t
<b>VOLUME</b>				
tsp	teaspoons	5	milliliters	ml
Tbsp	tablespoons	15	milliliters	ml
fl oz	fluid ounces	30	milliliters	ml
c	cups	0.24	liters	l
pt	pints	0.47	liters	l
qt	quarts	0.95	liters	l
gal	gallons	3.8	liters	l
ft <sup>3</sup>	cubic feet	0.03	cubic meters	m <sup>3</sup>
yd <sup>3</sup>	cubic yards	0.76	cubic meters	m <sup>3</sup>

## TEMPERATURE (exact)

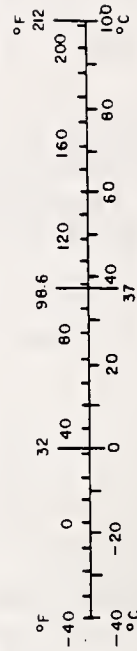
°F	Fahrenheit temperature	5/9 (after subtracting 32)	Celsius temperature	°C
----	------------------------	----------------------------	---------------------	----

## Approximate Conversions from Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol
<b>LENGTH</b>				
mm	millimeters	0.04	inches	in
cm	centimeters	0.4	inches	in
m	meters	3.3	feet	ft
m	meters	1.1	yards	yd
km	kilometers	0.6	miles	mi
<b>AREA</b>				
cm <sup>2</sup>	square centimeters	0.16	square inches	in <sup>2</sup>
m <sup>2</sup>	square meters	1.2	square yards	yd <sup>2</sup>
km <sup>2</sup>	square kilometers	0.4	square miles	mi <sup>2</sup>
ha	hectares (10,000 m <sup>2</sup> )	2.5	acres	
<b>MASS (weight)</b>				
g	grams	0.035	ounces	oz
kg	kilograms	2.2	pounds	lb
t	tonnes (1000 kg)	1.1	short tons	
<b>VOLUME</b>				
ml	milliliters	0.03	fluid ounces	fl oz
l	liters	2.1	pints	pt
l	liters	1.06	quarts	qt
l	liters	0.26	gallons	gal
m <sup>3</sup>	cubic meters	35	cubic feet	ft <sup>3</sup>
m <sup>3</sup>	cubic meters	1.3	cubic yards	yd <sup>3</sup>

## TEMPERATURE (exact)

°C	Celsius temperature	9/5 (then add 32)	Fahrenheit temperature	°F
----	---------------------	-------------------	------------------------	----



\* 1 in = 2.54 (exactly). For other exact conversions and more detailed tables, see NBS Misc. Publ. 286, Units of Weights and Measures, Part 2, 5, SI Catalog No. C13.10/286.



TABLE OF CONTENTS

SECTION	TITLE	PAGE
1.0	PURPOSE AND TEST PROCEDURE	1-1
2.0	VEHICLE AND TEST DATA	2-1
3.0	TEST NO. 930603-1 SUMMARY	3-1
4.0	TEST NO. 930603-2 SUMMARY	4-1
5.0	TEST NO. 930603-3 SUMMARY	5-1
6.0	TEST NO. 930603-4 SUMMARY	6-1
APPENDIX A	PHOTOGRAPHS	A-1
APPENDIX B	DATA PLOTS	B-1
APPENDIX C	MISCELLANEOUS TEST INFORMATION	C-1

LIST OF TABLES

NUMBER	DESCRIPTION	PAGE
1	VEHICLE INFORMATION	2-2
2	PROFILE MEASUREMENTS AT VEHICLE BUMPER HEIGHT	2-7
3	PROFILE MEASUREMENTS AT UNDERRIDE GUARD BUMPER HEIGHT	2-12
4	TEST NO. 930603-1 TEST CONDITIONS	3-2
5	TEST NO. 930603-1 VEHICLE CRUSH MEASUREMENTS	3-3
6	TEST NO. 930603-1 VEHICLE MEASUREMENTS	3-6
7	TEST NO. 930603-1 VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY	3-7
8	TEST NO. 930603-1 CAMERA INFORMATION	3-8
9	TEST NO. 930603-2 TEST CONDITIONS	4-2
10	TEST NO. 930603-2 VEHICLE CRUSH MEASUREMENTS	4-3
11	TEST NO. 930603-2 VEHICLE MEASUREMENTS	4-6
12	TEST NO. 930603-2 VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY	4-7
13	TEST NO. 930603-2 CAMERA INFORMATION	4-8
14	TEST NO. 930603-3 TEST CONDITIONS	5-2
15	TEST NO. 930603-3 VEHICLE CRUSH MEASUREMENTS	5-3
16	TEST NO. 930603-3 VEHICLE MEASUREMENTS	5-6
17	TEST NO. 930603-3 VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY	5-7
18	TEST NO. 930603-3 CAMERA INFORMATION	5-8
19	TEST NO. 930603-4 TEST CONDITIONS	6-2
20	TEST NO. 930603-4 VEHICLE CRUSH MEASUREMENTS	6-3
21	TEST NO. 930603-4 VEHICLE MEASUREMENTS	6-6
22	TEST NO. 930603-4 VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY	6-7
23	TEST NO. 930603-4 CAMERA INFORMATION	6-8

LIST OF FIGURES

NUMBER	DESCRIPTION	PAGE
1	VEHICLE ACCELEROMETER PLACEMENT	2-5
2	CAMERA POSITIONS	2-6
3	TEST 1 - VEHICLE CRUSH PROFILE AT VEHICLE BUMPER HEIGHT	3-4
4	TEST 1 - VEHICLE CRUSH PROFILE AT UNDERRIDE GUARD BUMPER HEIGHT	3-5
5	TEST 2 - VEHICLE CRUSH PROFILE AT VEHICLE BUMPER HEIGHT	4-4
6	TEST 2 - VEHICLE CRUSH PROFILE AT UNDERRIDE GUARD BUMPER HEIGHT	4-5
7	TEST 3 - VEHICLE CRUSH PROFILE AT VEHICLE BUMPER HEIGHT	5-4
8	TEST 3 - VEHICLE CRUSH PROFILE AT UNDERRIDE GUARD BUMPER HEIGHT	5-5
9	TEST 4 - VEHICLE CRUSH PROFILE AT VEHICLE BUMPER HEIGHT	6-4
10	TEST 4 - VEHICLE CRUSH PROFILE AT UNDERRIDE GUARD BUMPER HEIGHT	6-5





SECTION 1.0

PURPOSE AND TEST PROCEDURE

## PURPOSE AND TEST PROCEDURE

The purpose of the four (4) heavy truck rigid rear underride guard impact tests was for research and development in support of the CRASH3 damage algorithm reformulation.

The 1990 Ford Taurus was equipped with a 3.0-liter, 6-cylinder, transverse, gasoline engine with a 3-speed automatic transmission. The test weight of the vehicle was 3331 pounds.

The vehicle was instrumented with six (6) accelerometers to measure vehicle X-axis and Y-axis acceleration.

Each crash test event was recorded by two (2) high-speed motion picture cameras operating at approximately 1000 frames per second.

SECTION 2.0

VEHICLE AND TEST DATA

TABLE 1 TEST VEHICLE INFORMATION

VEHICLE MANUFACTURER: Ford Motor Company

MAKE/MODEL: Ford/Taurus

VIN: 1FABP50U7KG277510

BODY STYLE: 4-door sedan

MODEL YEAR: 1990

COLOR: Tan

ENGINE DATA: TYPE: transverse CYLINDERS: 6 DISPLACEMENT: 3.0-liter

TRANSMISSION DATA: 3 SPEED        MANUAL   X   AUTOMATIC  
  X   FWD        RWD,        4WD

DATE VEHICLE RECEIVED: 05/26/93

ODOMETER READING: 85,868

DEALER'S NAME AND ADDRESS: NA

ACCESSORIES:

POWER STEERING	Yes	AUTOMATIC TRANSMISSION	Yes
POWER BRAKES	Yes	AUTOMATIC SPEED CONTROL	Yes
POWER SEATS	No	TILTING STEERING WHEEL	Yes
POWER WINDOWS	No	TELESCOPING STEERING WHEEL	No
TINTED GLASS	Yes	AIR CONDITIONING	Yes
RADIO	No	ANTI-SKID BRAKE	No
CLOCK	Yes	REAR WINDOW DEFROSTER	Yes
OTHER	None		

REMARKS:

1. IS THE VEHICLE STOCK THROUGHOUT? Yes
2. DOES VEHICLE SHOW EVIDENCE OF PRIOR ACCIDENT HISTORY? Yes,  
broken left front headlight
3. DOES VEHICLE SHOW ANY SIGNIFICANT CORROSION? No
4. CONDITION OF THE FRONT/REAR BUMPER AND FRAME: Good

CERTIFICATION DATA FROM VEHICLE'S LABEL:

VEHICLE MANUFACTURED BY: Ford Motor Company

DATE OF MANUFACTURE: 08/89

VIN: 1FABP50U7KG277510

GVWR: 4660 LBS.

GAWR: FRONT: 2599 LBS., REAR: 2092 LBS.



TABLE 1 TEST VEHICLE INFORMATION, CONT'D.

TIRES ON VEHICLE (MFR., SIZE): All-American, P195/75R14

TIRE PRESSURE WITH MAXIMUM CAPACITY VEHICLE LOAD: FRONT: 35 PSI  
REAR: 35 PSI

SPARE TIRE (MFR., LINE, SIZE): NA, The vehicle did not contain a spare tire.

TYPE OF SEATS: FRONT: Split bench  
REAR: Bench

TYPE OF FRONT SEAT BACKS: Manually-adjustable

MAXIMUM WIDTH: 71.6 IN.

WHEELBASE: 106.2 IN.

LOCATION OF LABEL STATING TIRE DATA:

The label was located on the passenger's side rear door.

TIRE & CAPACITY DATA FROM VEHICLE'S LABEL:

RECOMMENDED TIRE SIZE: P205/70R14

RECOMMENDED COLD TIRE PRESSURE: FRONT: 35 PSI; REAR: 35 PSI

DESIGNATED SEATING CAPACITY: 2 FRONT 3 REAR 5 TOTAL

VEHICLE CAPACITY WEIGHT: 950 LBS.

TEST VEHICLE ATTITUDE (ALL MEASUREMENTS ARE IN INCHES):

DELIVERED ATTITUDE: LF 28.0; RF 28.1; LR 25.8; RR 25.8

PRE-TEST ATTITUDE: LF 30.9; RF 31.1; LR 27.2; RR 27.4

TABLE 1 TEST VEHICLE INFORMATION, CONT'D.

WEIGHT OF TEST VEHICLE AS RECEIVED (WITH MAXIMUM FLUIDS):

RIGHT FRONT	993 LBS.	RIGHT REAR	496 LBS.
LEFT FRONT	1005 LBS.	LEFT REAR	479 LBS.
TOTAL FRONT WEIGHT	1998 LBS.	(67.2% OF TOTAL VEHICLE WEIGHT)	
TOTAL REAR WEIGHT	975 LBS.	(32.8% OF TOTAL VEHICLE WEIGHT)	
TOTAL DELIVERED WEIGHT	2973 LBS.		

WEIGHT OF TEST VEHICLE:

RIGHT FRONT <sup>1</sup>	1388 LBS.	RIGHT REAR	233 LBS.
LEFT FRONT <sup>1</sup>	1365 LBS.	LEFT REAR	345 LBS.
TOTAL FRONT WEIGHT <sup>1</sup>	2753 LBS.	(82.6% OF TOTAL VEHICLE WEIGHT)	
TOTAL REAR WEIGHT	578 LBS.	(17.4% OF TOTAL VEHICLE WEIGHT)	
TOTAL TEST WEIGHT <sup>2</sup>	3331 LBS.		

WEIGHT OF BALLAST SECURED IN VEHICLE CARGO AREA: 0 LBS.

COMPONENTS REMOVED TO MEET TARGET TEST WEIGHT: None

CG = 14.3 INCHES REARWARD OF THIRD AXLE CENTERLINE

<sup>1</sup>The front wheel weights are for third axle wheels.

<sup>2</sup>Weight of third axle included in total test weight.

FIGURE 1 VEHICLE ACCELEROMETER PLACEMENT

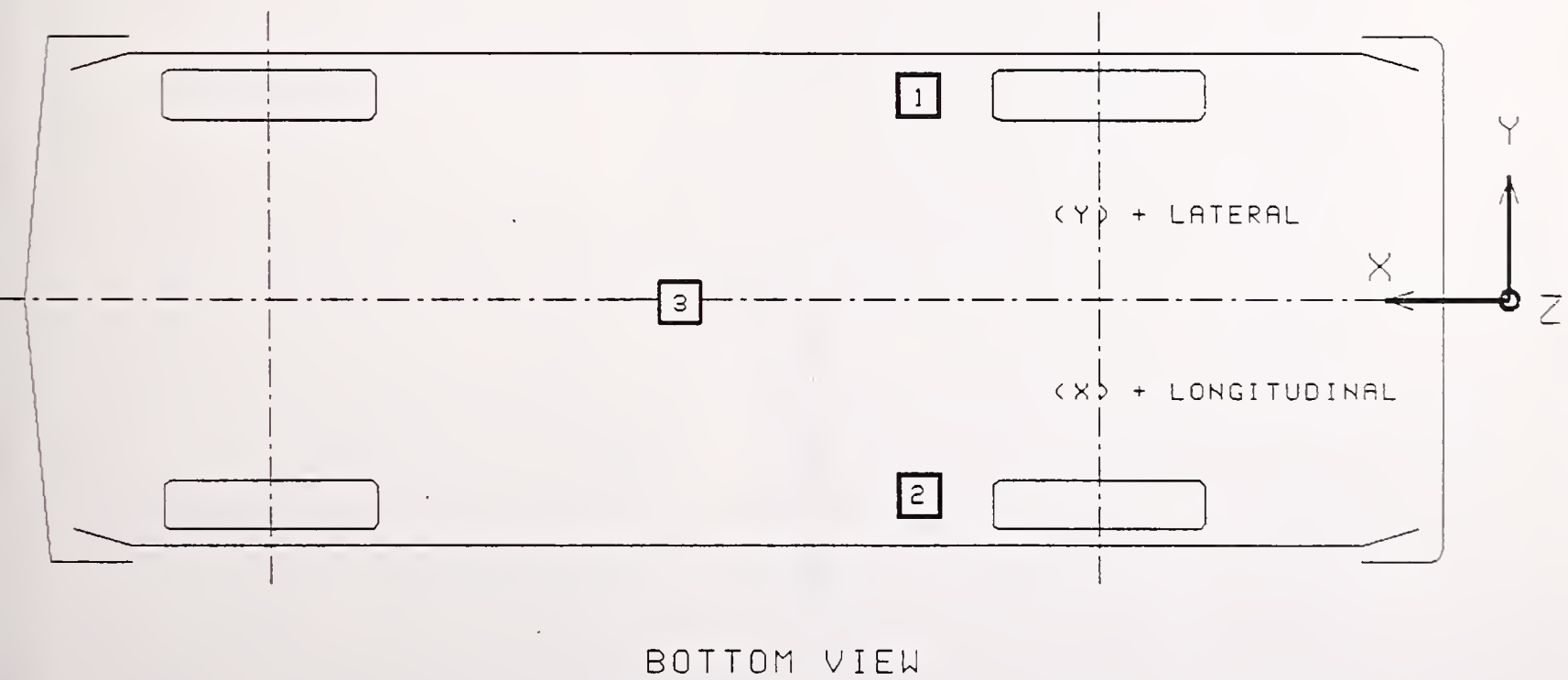
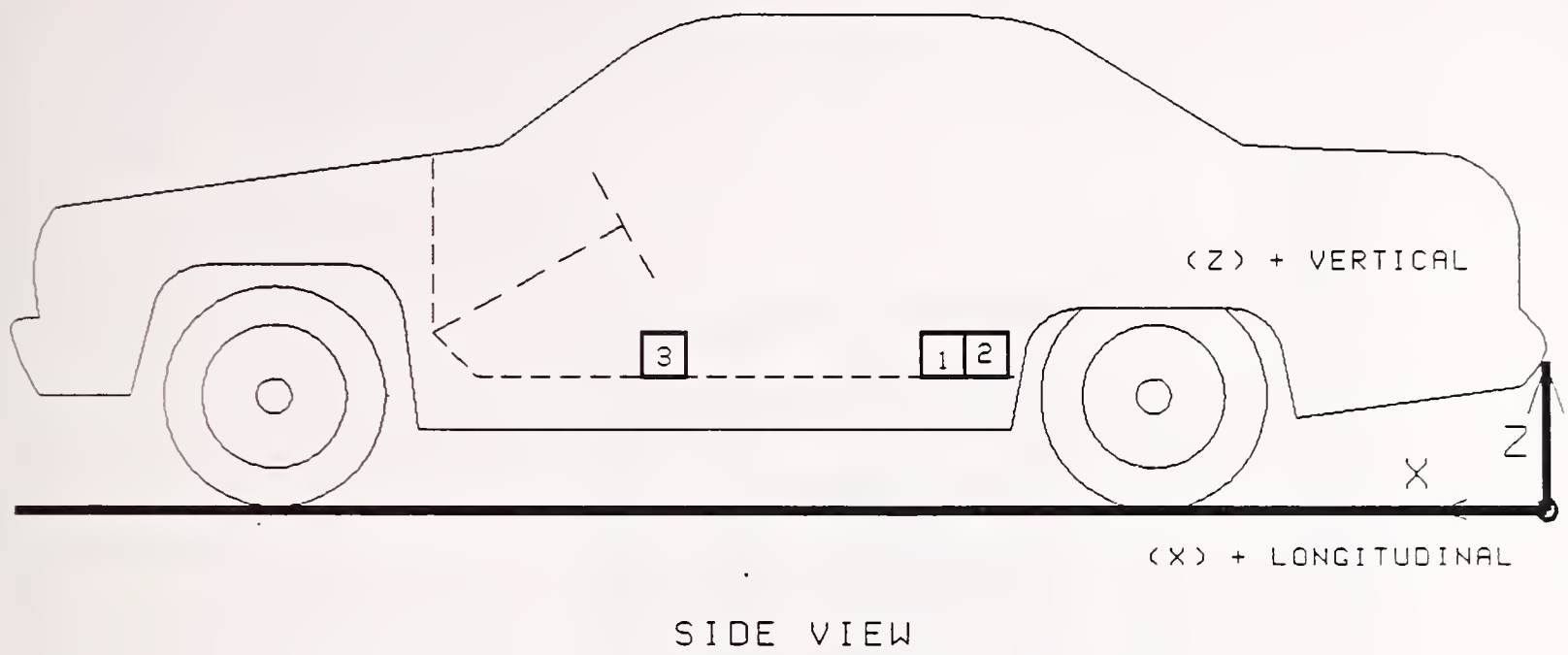


FIGURE 2 CAMERA POSITIONS

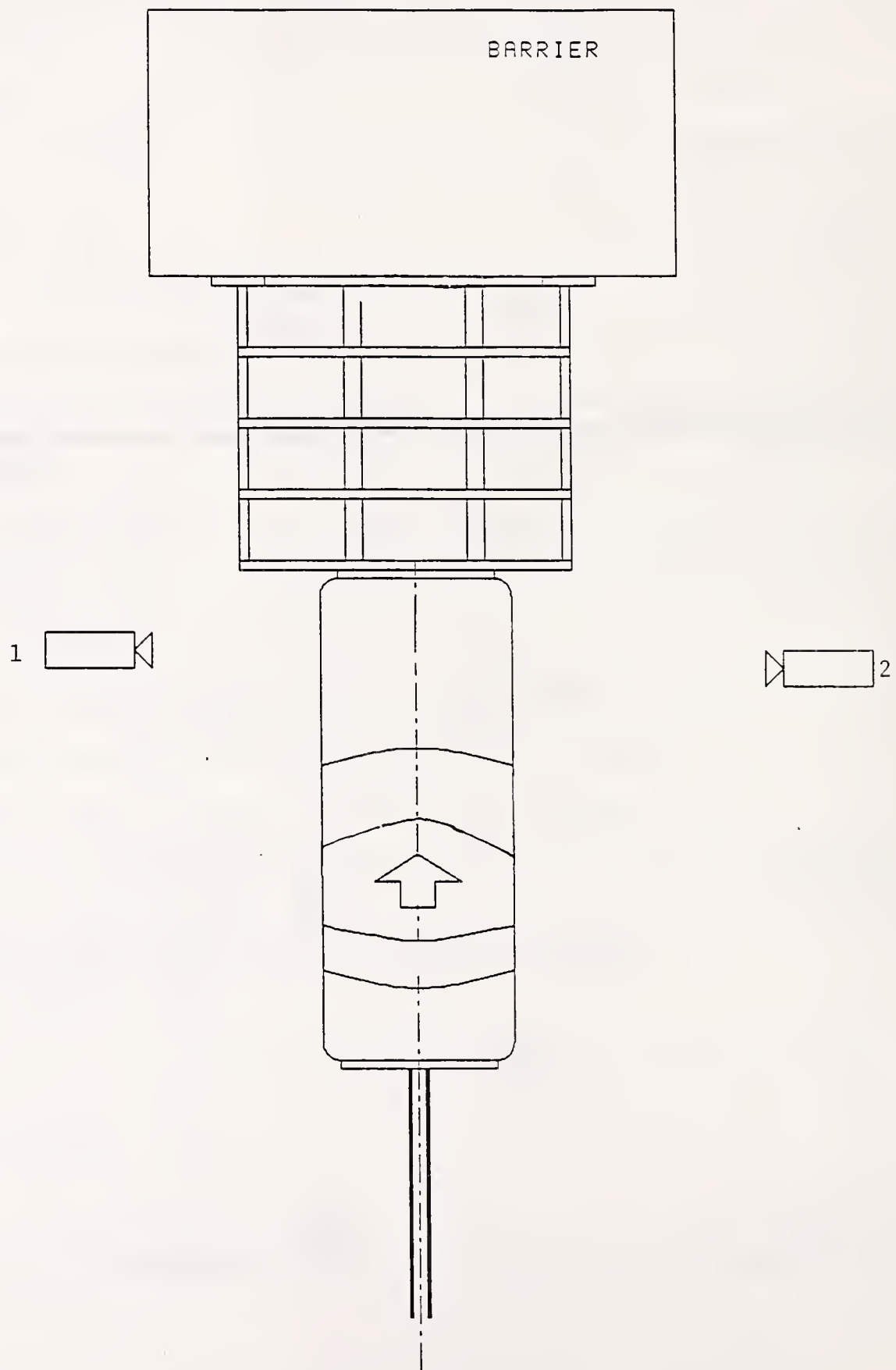




TABLE 2 PROFILE MEASUREMENTS AT VEHICLE BUMPER HEIGHT (21.1 INCHES)

LOCATION	0		1		2		3		4		5		6		7		8	
	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y
PRE-TEST	121.6	25.6	118.6	25.2	115.5	25.3	112.4	25.3	109.6	25.3	106.4	25.4	103.5	25.4	100.5	25.5	97.5	25.6
POST-TEST 1	121.6	25.6	118.6	25.2	115.5	25.3	112.4	25.3	109.6	25.3	106.4	25.4	103.5	25.4	100.5	25.5	97.5	25.6
POST-TEST 2	121.3	25.6	118.4	25.5	115.4	25.5	112.3	25.3	109.4	25.5	106.4	25.5	103.4	25.5	100.4	25.4	97.5	25.4
POST-TEST 3	121.5	25.1	118.6	25.1	115.6	25.2	112.5	25.2	109.6	25.2	106.5	25.0	103.5	25.1	100.5	25.1	97.5	25.2
POST-TEST 4	121.8	24.8	119.5	24.2	116.5	24.6	113.4	24.4	110.5	24.4	107.5	24.3	104.7	24.1	101.6	24.2	98.6	24.1
LOCATION	9		10		11		12		13		14		15		16		17	
	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y
PRE-TEST	94.4	25.6	91.4	25.6	88.5	25.6	85.4	25.8	82.5	25.9	79.5	26.0	76.5	25.9	73.5	25.9	70.4	25.7
POST-TEST 1	94.4	25.6	91.4	25.6	88.5	25.6	85.4	25.8	82.5	25.9	79.5	26.0	76.2	25.9	73.4	25.7	70.3	25.3
POST-TEST 2	94.4	25.4	91.4	25.4	88.4	25.5	85.4	25.6	82.4	25.8	79.5	25.8	74.4	26.0	71.4	26.5	68.7	26.5
POST-TEST 3	94.5	25.2	91.5	25.3	88.5	25.4	85.5	25.5	82.5	25.6	79.6	25.6	74.4	25.8	71.4	26.2	69.0	26.4
POST-TEST 4	95.6	24.2	92.6	23.9	89.6	23.9	86.6	24.0	83.6	24.0	80.5	24.2	75.5	25.4	73.3	26.2	71.4	26.6

All measurements are in inches. Column readings are three inches apart from front to rear on vehicle.

All X-axis measurements taken from a reference plane 206.9 inches from and parallel to the rear bumper.

All Y-axis measurements taken from a reference plane 48 inches from and parallel to the vehicle longitudinal centerline.

TABLE 2 PROFILE MEASUREMENTS AT VEHICLE BUMPER HEIGHT (21.1 INCHES)

LOCATION	18	19	20	21	22	23	24	25	26									
	X	Y	X	Y	X	Y	X	Y	X									
PRE-TEST	67.8	25.6	64.6	25.6	61.5	25.7	58.5	25.8	55.5	25.9	52.6	26.1	49.5	26.3	46.6	26.6	43.6	26.2
POST-TEST 1	67.5	25.0	64.5	24.8	61.6	25.0	58.5	25.1	55.5	24.8	52.5	25.1	49.4	25.4	46.8	25.9	43.4	26.1
POST-TEST 2	66.0	26.5	63.1	26.8	60.9	26.3	59.0	25.4	57.1	24.9	55.0	24.7	52.8	25.1	51.3	25.5	43.3	26.2
POST-TEST 3	66.1	26.1	63.5	26.5	61.5	26.6	60.8	26.5	59.2	26.1	57.5	24.9	55.9	24.2	55.2	24.4	43.8	25.9
POST-TEST 4	69.9	27.0	NA	NA	NA	NA	NA	NA	71.0	28.5	72.9	29.4	73.0	28.3	72.7	27.4	49.5	26.0
LOCATION	27	28	29	30	31	32	33	34	35									
	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y
PRE-TEST	40.5	26.6	37.6	26.9	34.5	27.4	31.6	27.9	28.8	28.4	25.8	29.4	23.8	31.3	22.6	33.9	21.8	36.9
POST-TEST 1	40.2	26.4	37.2	26.8	34.3	27.5	31.3	27.9	28.4	28.5	25.7	29.7	23.7	31.6	22.5	34.3	21.6	37.2
POST-TEST 2	40.3	26.6	37.3	26.8	34.4	27.1	31.6	27.6	28.8	28.4	26.1	29.3	23.6	31.4	22.5	34.0	21.6	36.7
POST-TEST 3	40.8	26.3	37.9	26.5	35.0	27.1	32.0	27.6	29.1	28.2	26.0	29.1	23.8	31.3	22.9	34.0	22.1	37.0
POST-TEST 4	46.4	26.2	43.6	26.4	40.7	26.3	37.7	26.7	34.8	27.3	31.5	28.2	29.7	30.2	28.5	32.6	27.4	35.5

All measurements are in inches. Column readings are three inches apart from front to rear on vehicle.

All X-axis measurements taken from a reference plane 206.9 inches from and parallel to the rear bumper.

All Y-axis measurements taken from a reference plane 48 inches from and parallel to the vehicle longitudinal centerline.

TABLE 2 PROFILE MEASUREMENTS AT VEHICLE BUMPER HEIGHT (21.1 INCHES)

LOCATION	36		37		38		39		40		41		42		43		44	
	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y
PRE-TEST	21.1	39.7	20.6	42.6	20.1	45.4	19.6	48.7	19.4	51.8	19.1	54.8	19.0	57.5	18.9	60.6	19.0	62.8
POST-TEST 1	21.2	40.1	20.5	43.1	20.1	46.2	19.7	49.2	19.1	52.2	18.8	55.3	18.8	58.3	18.7	61.2	18.9	64.1
POST-TEST 2	20.9	39.6	20.5	42.5	19.9	45.6	19.4	48.6	19.2	51.5	18.8	54.5	18.7	57.4	18.7	60.5	18.8	62.9
POST-TEST 3	21.4	39.6	20.6	42.6	19.9	45.7	19.8	48.8	19.8	51.7	18.9	54.8	19.1	57.7	18.9	60.8	19.1	63.5
POST-TEST 4	26.9	38.4	26.2	41.3	25.5	44.2	24.8	47.2	24.3	50.1	23.9	53.1	23.4	56.1	23.0	59.1	23.2	61.9
LOCATION	45		46		47		48		49		50		51		52		53	
	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y
PRE-TEST	19.2	65.8	19.5	68.9	19.9	71.9	20.2	74.9	20.6	77.8	21.3	80.8	22.0	83.8	23.0	86.6	24.2	89.4
POST-TEST 1	18.9	67.1	19.2	70.1	19.4	73.1	19.9	76.0	20.3	79.0	21.1	81.8	21.8	84.9	22.5	87.7	23.8	90.1
POST-TEST 2	18.9	66.0	19.1	69.0	19.5	71.9	19.8	74.8	20.5	77.8	21.0	80.8	21.8	83.7	22.6	86.5	23.8	89.3
POST-TEST 3	19.1	66.0	19.2	69.1	19.9	71.9	20.0	74.9	20.6	78.0	21.3	80.9	22.2	84.0	22.9	86.8	24.2	89.6
POST-TEST 4	23.5	64.9	23.4	67.8	23.5	70.8	23.9	73.7	24.2	76.7	24.7	75.6	25.5	82.6	25.8	85.4	27.1	88.2

All measurements are in inches. Column readings are three inches apart from front to rear on vehicle.

All X-axis measurements taken from a reference plane 206.9 inches from and parallel to the rear bumper.

All Y-axis measurements taken from a reference plane 48 inches from and parallel to the vehicle longitudinal centerline.





TABLE 2 PROFILE MEASUREMENTS AT VEHICLE BUMPER HEIGHT (21.1 INCHES)

LOCATION	72	73	74	75	76	77	78	79	80
	X	Y	X	Y	X	Y	X	Y	X
PRE-TEST	79.9	94.5	82.9	94.6	85.8	94.8	88.9	94.7	91.9
POST-TEST 1	79.9	94.5	82.9	94.6	85.8	94.8	88.9	94.7	91.9
POST-TEST 2	79.1	94.6	62.2	94.6	85.2	94.7	88.7	94.8	91.2
POST-TEST 3	79.6	94.2	82.6	94.4	85.6	94.7	88.8	94.9	91.8
POST-TEST 4	80.2	94.9	83.2	94.9	86.0	94.8	89.0	95.2	91.9
LOCATION	81	82	83	84	85	86			
	X	Y	X	Y	X	Y	X	Y	
PRE-TEST	106.9	94.9	109.9	94.9	112.8	95.0	115.8	95.0	118.6
POST-TEST 1	106.9	94.9	109.9	94.9	112.8	95.0	115.8	95.0	118.6
POST-TEST 2	106.2	95.0	109.2	95.1	112.2	94.9	115.2	94.7	118.1
POST-TEST 3	106.8	95.2	109.8	95.1	112.8	95.1	115.8	95.1	118.8
POST-TEST 4	106.9	95.5	109.9	95.3	112.9	95.2	116.1	95.4	118.8

All measurements are in inches. Column readings are three inches apart from front to rear on vehicle.

All X-axis measurements taken from a reference plane 206.9 inches from and parallel to the rear bumper.

All Y-axis measurements taken from a reference plane 48 inches from and parallel to the vehicle longitudinal centerline.

TABLE 3 PROFILE MEASUREMENTS AT UNDERRIDE GUARD BUMPER HEIGHT (34.7 INCHES)

LOCATION	0		1		2		3		4		5		6		7		8	
	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y
PRE-TEST	121.6	25.6	118.6	25.2	115.5	25.3	112.4	25.3	109.6	25.3	106.4	25.4	103.5	25.4	100.5	25.5	97.5	25.6
POST-TEST 1	121.6	25.6	118.6	25.2	115.5	25.3	112.4	25.3	109.6	25.3	106.4	25.4	103.5	25.4	100.5	25.5	97.5	25.6
POST-TEST 2	121.3	25.6	118.4	25.5	115.4	25.5	112.3	25.3	109.4	25.5	106.4	25.5	103.4	25.5	100.4	25.4	97.5	25.4
POST-TEST 3	121.5	25.1	118.6	25.1	115.6	25.2	112.5	25.2	109.6	25.2	106.5	25.0	103.5	25.1	100.5	25.1	97.5	25.2
POST-TEST 4	121.8	24.8	119.5	24.2	116.5	24.6	113.4	24.4	110.5	24.4	107.5	24.3	104.7	24.1	101.6	24.2	98.6	24.1
LOCATION	9		10		11		12		13		14		15		16		17	
	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y
PRE-TEST	94.4	25.6	91.4	25.6	88.5	25.6	85.4	25.8	82.5	25.9	79.5	26.0	76.5	25.9	73.5	25.9	70.4	25.7
POST-TEST 1	94.4	25.6	91.4	25.6	88.5	25.6	85.4	25.8	82.5	25.9	79.5	26.0	76.2	25.9	73.4	25.7	70.3	25.3
POST-TEST 2	94.4	25.4	91.4	25.4	88.4	25.5	85.4	25.6	82.4	25.8	79.5	25.8	74.4	26.0	71.4	26.5	68.7	26.5
POST-TEST 3	94.5	25.2	91.5	25.3	88.5	25.4	85.5	25.5	82.5	25.6	79.6	25.6	74.4	25.8	71.4	26.2	69.0	26.4
POST-TEST 4	95.6	24.2	92.6	23.9	89.6	23.9	86.6	24.0	83.6	24.0	80.5	24.2	75.5	25.4	73.3	26.2	71.4	26.6

All measurements are in inches. Column readings are three inches apart from front to rear on vehicle.

All X-axis measurements taken from a reference plane 206.9 inches from and parallel to the rear bumper.

All Y-axis measurements taken from a reference plane 48 inches from and parallel to the vehicle longitudinal centerline.

TABLE 3 PROFILE MEASUREMENTS AT UNDERRIDE GUARD BUMPER HEIGHT (34.7 INCHES)

LOCATION	18		19		20		21		22		23		24		25		26	
	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y
PRE-TEST	67.8	25.6	64.6	25.6	61.5	25.7	58.5	25.8	55.8	27.9	52.8	28.1	49.8	28.4	46.9	28.7	44.0	29.0
POST-TEST 1	67.5	25.0	64.5	24.8	61.6	25.0	58.5	25.1	56.3	27.1	53.1	26.9	50.0	27.3	47.1	27.5	44.2	28.5
POST-TEST 2	66.0	26.5	63.1	26.8	60.9	26.3	59.0	25.4	55.8	28.3	53.4	27.3	50.8	26.5	48.2	25.9	45.8	25.9
POST-TEST 3	66.1	26.1	63.5	26.5	61.5	26.6	60.8	26.5	56.7	28.6	54.9	27.5	53.9	26.3	51.2	25.1	49.0	24.8
POST-TEST 4	69.9	27.0	NA	NA	NA	NA	NA	NA	68.4	29.4	68.5	29.9	68.6	27.7	67.6	25.8	66.5	24.5
LOCATION	27	28	29	30	31	32	33	34	35									
PRE-TEST	41.0	29.2	38.1	29.6	35.1	30.1	32.2	30.8	29.6	32.4	28.5	35.1	27.9	38.1	27.2	41.1	26.8	44.2
POST-TEST 1	41.2	28.6	38.3	28.7	35.3	29.4	32.2	30.1	31.0	32.8	28.5	35.3	28.6	38.3	28.2	41.3	28.0	44.3
POST-TEST 2	43.4	26.0	40.7	26.2	39.0	27.3	38.4	30.3	37.7	33.2	31.8	35.2	32.2	38.4	32.9	41.3	33.3	44.1
POST-TEST 3	46.8	24.2	44.9	23.5	43.8	25.3	41.8	29.6	41.2	31.1	35.4	35.2	36.3	38.5	37.3	41.2	37.0	44.0
POST-TEST 4	65.3	22.6	64.0	20.9	63.4	23.1	62.0	26.2	51.5	27.6	51.9	34.5	52.6	37.3	54.4	39.4	54.5	42.1

All measurements are in inches. Column readings are three inches apart from front to rear on vehicle.

All X-axis measurements taken from a reference plane 206.9 inches from and parallel to the rear bumper.

All Y-axis measurements taken from a reference plane 48 inches from and parallel to the vehicle longitudinal centerline.

TABLE 3 PROFILE MEASUREMENTS AT UNDERRIDE GUARD BUMPER HEIGHT (34.7 INCHES)

LOCATION	36		37		38		39		40		41		42		43		44	
	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y
PRE-TEST	26.4	47.1	26.1	50.1	26.0	53.1	25.8	56.1	25.7	59.1	25.8	62.1	25.9	64.4	26.0	67.4	26.2	70.4
POST-TEST 1	27.8	47.3	27.3	50.2	27.2	53.3	27.1	56.2	27.1	59.3	27.3	62.3	27.4	65.4	27.4	68.3	27.6	71.3
POST-TEST 2	32.4	47.0	31.6	49.7	31.3	52.7	31.5	55.3	31.2	58.7	31.4	61.8	31.5	64.3	31.6	66.1	32.0	70.1
POST-TEST 3	35.7	46.6	35.1	49.3	34.9	52.3	34.8	55.3	34.5	58.3	34.6	61.2	35.1	64.1	35.4	67.1	35.8	70.2
POST-TEST 4	53.0	45.0	52.5	47.8	52.1	50.8	51.5	53.9	51.7	56.9	51.2	59.6	51.7	63.0	51.6	65.9	52.8	68.7
LOCATION	45		46		47		48		49		50		51		52		53	
	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y
PRE-TEST	26.6	73.4	27.0	76.2	27.5	79.3	28.0	82.2	28.6	85.1	29.9	88.0	32.4	89.7	35.3	90.3	38.2	90.8
POST-TEST 1	27.9	74.3	27.9	77.2	27.8	80.1	27.7	83.0	28.3	86.0	29.7	89.8	32.3	91.3	35.3	92.1	38.2	92.7
POST-TEST 2	32.5	73.0	33.0	76.0	32.5	78.7	31.1	81.2	30.1	83.9	32.1	85.9	33.9	88.6	35.4	91.0	37.9	91.9
POST-TEST 3	36.8	72.9	37.5	75.8	36.4	78.4	34.9	80.8	33.8	83.7	32.7	84.9	34.5	87.7	35.3	89.8	38.0	91.1
POST-TEST 4	54.1	71.2	55.3	73.7	55.1	76.0	53.1	77.6	50.4	79.3	38.3	77.7	40.5	80.1	41.7	82.0	44.3	83.3

All measurements are in inches. Column readings are three inches apart from front to rear on vehicle.

All X-axis measurements taken from a reference plane 206.9 inches from and parallel to the rear bumper.

All Y-axis measurements taken from a reference plane 48 inches from and parallel to the vehicle longitudinal centerline.



TABLE 3 PROFILE MEASUREMENTS AT UNDERRIDE GUARD BUMPER HEIGHT (34.7 INCHES)

LOCATION	54	55	56	57	58	59	60	61	62
	X	Y	X	Y	X	Y	X	Y	X
PRE-TEST	41.1	91.2	44.2	91.5	47.2	91.9	50.1	92.1	53.1
POST-TEST 1	40.9	92.9	44.0	93.0	47.0	93.7	49.8	94.0	52.8
POST-TEST 2	40.6	92.5	43.7	92.8	46.7	92.9	49.6	93.2	52.5
POST-TEST 3	40.6	91.8	43.6	91.9	47.0	92.1	50.0	92.8	52.9
POST-TEST 4	47.4	84.9	49.6	84.9	52.5	87.2	55.0	87.9	57.9
LOCATION	63	64	65	66	67	68	69	70	71
	X	Y	X	Y	X	Y	X	Y	X
PRE-TEST	53.1	94.5	56.0	94.6	59.0	94.7	62.1	94.8	65.1
POST-TEST 1	52.9	96.4	56.1	96.4	59.9	96.5	62.2	95.6	65.1
POST-TEST 2	52.5	95.8	55.5	95.2	58.3	94.7	61.4	94.3	64.1
POST-TEST 3	53.0	95.7	56.0	95.2	58.8	94.8	61.5	94.5	64.2
POST-TEST 4	57.7	91.6	60.7	90.9	63.5	90.9	66.2	90.7	66.8

All measurements are in inches. Column readings are three inches apart from front to rear on vehicle.

All X-axis measurements taken from a reference plane 206.9 inches from and parallel to the rear bumper.

All Y-axis measurements taken from a reference plane 48 inches from and parallel to the vehicle longitudinal centerline.



TABLE 3 PROFILE MEASUREMENTS AT UNDERRIDE GUARD BUMPER HEIGHT (34.7 INCHES)

LOCATION	72	73	74	75	76	77	78	79	80
	X	Y	X	Y	X	Y	X	Y	X
PRE-TEST	79.9	94.5	82.9	94.6	85.8	94.8	88.9	94.7	91.9
POST-TEST 1	79.9	94.5	82.9	94.6	85.8	94.8	88.9	94.7	91.9
POST-TEST 2	79.1	94.6	62.2	94.6	85.2	94.7	88.7	94.8	91.2
POST-TEST 3	79.6	94.2	82.6	94.4	85.6	94.7	88.8	94.9	91.8
POST-TEST 4	80.2	94.9	83.2	94.9	86.0	94.8	89.0	95.2	91.9
LOCATION	81	82	83	84	85	86			
	X	Y	X	Y	X	Y	X	Y	
PRE-TEST	106.9	94.9	109.9	94.9	112.8	95.0	115.8	95.0	118.6
POST-TEST 1	106.9	94.9	109.9	94.9	112.8	95.0	115.8	95.0	118.6
POST-TEST 2	106.2	95.0	109.2	95.1	112.2	94.9	115.2	94.7	118.1
POST-TEST 3	106.8	95.2	109.8	95.1	112.8	95.1	115.8	95.1	118.8
POST-TEST 4	106.9	95.5	109.9	95.3	112.9	95.3	116.1	95.4	118.8

All measurements are in inches. Column readings are three inches apart from front to rear on vehicle.

All X-axis measurements taken from a reference plane 206.9 inches from and parallel to the rear bumper.

All Y-axis measurements taken from a reference plane 48 inches from and parallel to the vehicle longitudinal centerline.

SECTION 3.0

TEST 930603-1 SUMMARY

TABLE 4  
TEST NO. 930603-1 TEST CONDITIONS

DATE OF TEST: 06/03/93

TIME OF TEST: 1142

AMBIENT TEMPERATURE AT IMPACT AREA: 64° F

INTENDED IMPACT VELOCITY: 10.0 MPH

ACTUAL IMPACT VELOCITY: PRIMARY = 10.0 MPH  
SECONDARY = 10.0 MPH

SUBJECT VEHICLE DATA

LENGTH OF DIRECT CONTACT DAMAGE: 56.4 IN.

MAXIMUM CUMULATIVE CRUSH  
AT VEHICLE BUMPER HEIGHT: 0.1 IN.

MAXIMUM CUMULATIVE CRUSH AT  
UNDERRIDE GUARD BUMPER HEIGHT: 1.5 IN.

VEHICLE ATTITUDES:

POST-TEST: LF: 31.2; RF: 31.4; LR: 27.4; RR: 27.5

All distance measurements are in inches.

TABLE 5  
TEST NO. 930603-1 VEHICLE CRUSH MEASUREMENTS

VEHICLE BUMPER HEIGHT MEASUREMENTS

FL	<u>62.2</u>
C1	<u>-0.1</u>
C2	<u>-0.1</u>
C3	<u>-0.3</u>
C4	<u>-0.3</u>
C5	<u>-0.3</u>
C6	<u>-0.2</u>

UNDERRIDE GUARD BUMPER HEIGHT MEASUREMENTS

FL	<u>62.0</u>
C1	<u>0.0</u>
C2	<u>1.0</u>
C3	<u>1.3</u>
C4	<u>1.4</u>
C5	<u>0.3</u>
C6	<u>0.0</u>

NOTE: FL is post-test length of damage surface.

Measurements C1 - C6 were spaced equally apart over the post-impact length of the vehicle front. This distance is defined as length "FL" on the vehicle crush profile plot.

All measurements are in inches.

FIGURE 3

TEST 1 - VEHICLE CRUSH PROFILE AT VEHICLE BUMPER HEIGHT

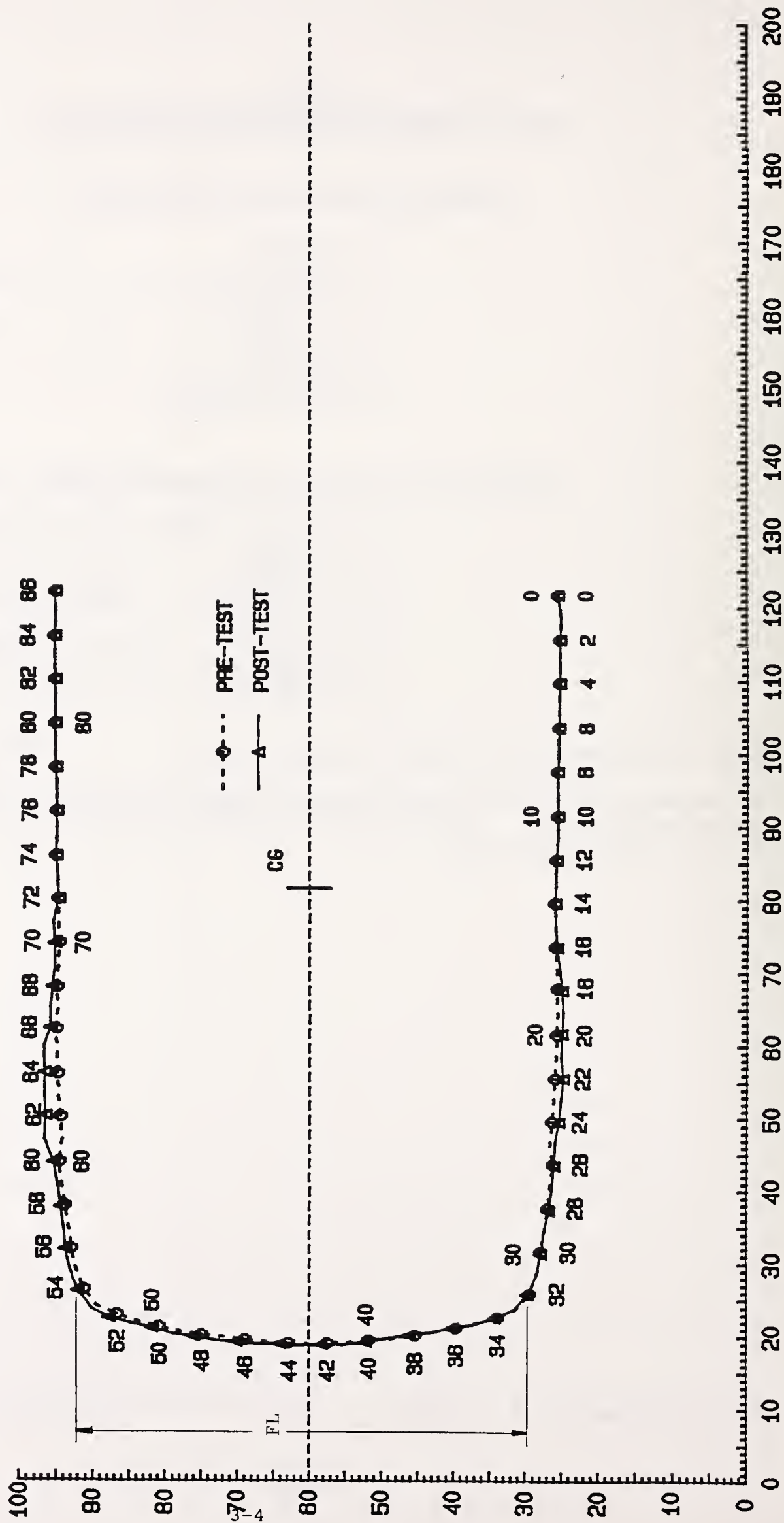


FIGURE 4

TEST 1 - VEHICLE CRUSH PROFILE AT UNDERRIDE GUARD BUMPER HEIGHT

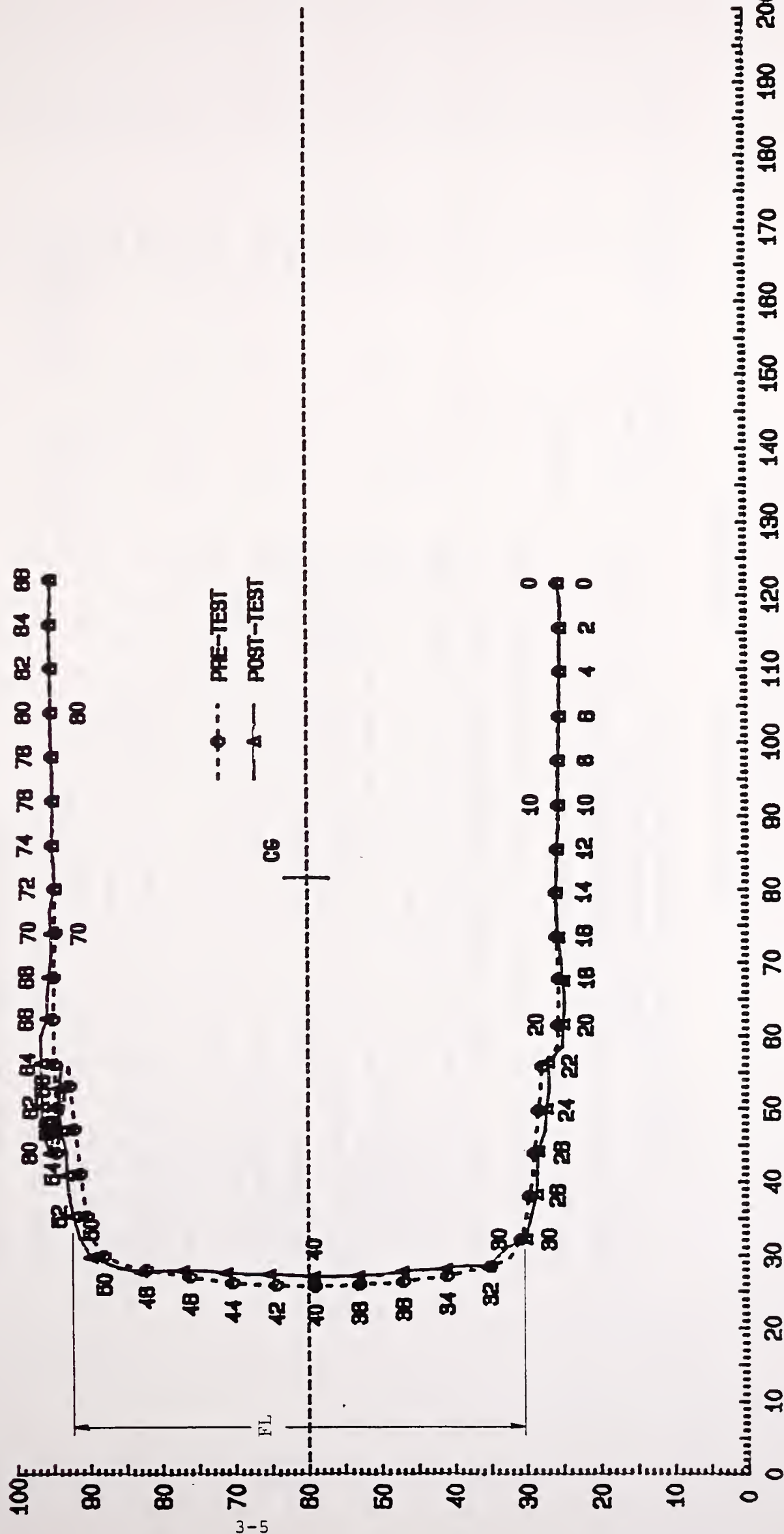




TABLE 6  
TEST NO. 930603-1 VEHICLE MEASUREMENTS  
VEHICLE MAKE/MODEL: Ford/Taurus

NO.	TYPE OF MEASUREMENT	PRE-TEST	POST-TEST	DIFF.
X1	TOTAL LENGTH OF VEHICLE AT CENTERLINE	188.0	188.2	-0.2
X2	REAR SURFACE OF VEHICLE TO FRONT OF ENGINE BLOCK	40.0	NA	NA
X3	REAR SURFACE OF VEHICLE TO FIREWALL	65.0	NA	NA
X4	REAR SURFACE OF VEHICLE TO UPPER LEADING EDGE OF RIGHT DOOR	129.9	130.2	-0.3
X5	REAR SURFACE OF VEHICLE TO UPPER LEADING EDGE OF LEFT DOOR	129.9	130.2	-0.3
X6	REAR SURFACE OF VEHICLE TO LOWER LEADING EDGE OF RIGHT DOOR	127.7	127.8	-0.1
X7	REAR SURFACE OF VEHICLE TO LOWER LEADING EDGE OF LEFT DOOR	127.7	128.0	-0.3
X8	REAR SURFACE OF VEHICLE TO UPPER TRAILING EDGE OF RIGHT DOOR	87.2	87.6	-0.4
X9	REAR SURFACE OF VEHICLE TO UPPER TRAILING EDGE OF LEFT DOOR	87.1	87.4	-0.3
X10	REAR SURFACE OF VEHICLE TO LOWER TRAILING EDGE OF RIGHT DOOR	87.0	86.8	0.2
X11	REAR SURFACE OF VEHICLE TO LOWER TRAILING EDGE OF LEFT DOOR	86.8	87.1	-0.3
X12	REAR SURFACE OF VEHICLE TO BOTTOM OF "A" POST ON RIGHT SIDE	127.0	126.8	0.2
X13	REAR SURFACE OF VEHICLE TO BOTTOM OF "A" POST ON LEFT SIDE	127.0	NA	NA
X14	REAR SURFACE OF VEHICLE TO FIREWALL - RIGHT SIDE	65.5	NA	NA
X15	REAR SURFACE OF VEHICLE TO FIREWALL - LEFT SIDE	66.8	NA	NA
X16	REAR SURFACE OF VEHICLE TO STEERING WHEEL CENTER	111.0	111.6	-0.6
X17	CENTER OF STEERING COLUMN TO "A" POST	10.8	10.9	-0.1
X18	CENTER OF STEERING COLUMN TO HEADLINER	16.4	16.4	0.0
X19	REAR SURFACE OF VEHICLE TO RIGHT SIDE OF FRONT BUMPER	183.9	184.4	-0.5
X20	REAR SURFACE OF VEHICLE TO LEFT SIDE OF FRONT BUMPER	184.3	184.4	-0.1
X21	LENGTH OF ENGINE BLOCK	15.0	15.0	0.0

All distance measurements are in inches.

TABLE 7

## VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY

TEST NUMBER 930603-1

No. LOCATION	X*	Y*	Z*	POSITIVE		NEGATIVE	
				DIRECTION		DIRECTION	
				MAX G MSEC		MAX G MSEC	
1 LEFT REAR SILL	71.4	29.3	18.2				
LONGITUDINAL				1.1	158.0	10.7	68.6
LATERAL				1.4	99.8	0.7	65.1
2 RIGHT REAR SILL	71.9	-29.0	19.0				
LONGITUDINAL				1.2	209.5	10.6	70.1
LATERAL				1.5	72.8	1.2	111.5
3 VEHICLE CENTER	111.9	0.0	15.9				
OF GRAVITY							
LONGITUDINAL				0.9	210.3	10.9	69.0
LATERAL				3.5	302.8	5.1	38.1
RESULTANT				11.1	69.1		

\* ALL MEASUREMENTS OF ACCELEROMETER LOCATIONS ARE IN INCHES.

REFERENCE: X: + FORWARD FROM VEHICLE'S REAR BUMPER

Y: + LEFTWARD FROM VEHICLE'S LONGITUDINAL CENTERLINE

Z: + UPWARD FROM GROUND LEVEL

TABLE 8  
TEST NO. 930603-1 CAMERA INFORMATION

CAMERA NUMBER	LOCATION	TYPE	LENS (mm)	SPEED (fps)	PURPOSE OF CAMERA DATA
1	Left tight	Photosonic	25	1018	Impact overall
2	Right wide	Photosonic	13	1000	Impact overall

SECTION 4.0

TEST 930603-2 SUMMARY

TABLE 9

TEST NO. 930603-2 TEST CONDITIONS

DATE OF TEST: 06/03/93

TIME OF TEST: 1344

AMBIENT TEMPERATURE AT IMPACT AREA: 66° F

INTENDED IMPACT VELOCITY: 15.0 MPH

ACTUAL IMPACT VELOCITY: PRIMARY = 15.0 MPH  
SECONDARY = 15.0 MPH

SUBJECT VEHICLE DATA

LENGTH OF DIRECT CONTACT DAMAGE: 59.1 IN.

MAXIMUM CUMULATIVE CRUSH  
AT VEHICLE BUMPER HEIGHT: 0.3 IN.

MAXIMUM CUMULATIVE CRUSH AT  
UNDERRIDE GUARD BUMPER HEIGHT: 8.1 IN.

VEHICLE ATTITUDES:

POST-TEST: LF: 36.2; RF: 31.7; LR: 27.6; RR: 27.3

All distance measurements are in inches.

TABLE 10  
TEST NO. 930603-2 VEHICLE CRUSH MEASUREMENTS

VEHICLE BUMPER HEIGHT MEASUREMENTS

FL	<u>61.4</u>
C1	<u>0.3</u>
C2	<u>-0.1</u>
C3	<u>-0.3</u>
C4	<u>-0.3</u>
C5	<u>-0.1</u>
C6	<u>-0.4</u>

UNDERRIDE GUARD BUMPER HEIGHT MEASUREMENTS

FL	<u>64.8</u>
C1	<u>2.6</u>
C2	<u>4.3</u>
C3	<u>5.3</u>
C4	<u>5.6</u>
C5	<u>5.0</u>
C6	<u>0.1</u>

NOTE: FL is post-test length of damage surface.

Measurements C1 - C6 were spaced equally apart over the post-impact length of the vehicle front. This distance is defined as length "FL" on the vehicle crush profile plot.

All measurements are in inches.



FIGURE 5

TEST 2 - VEHICLE CRUSH PROFILE AT VEHICLE BUMPER HEIGHT

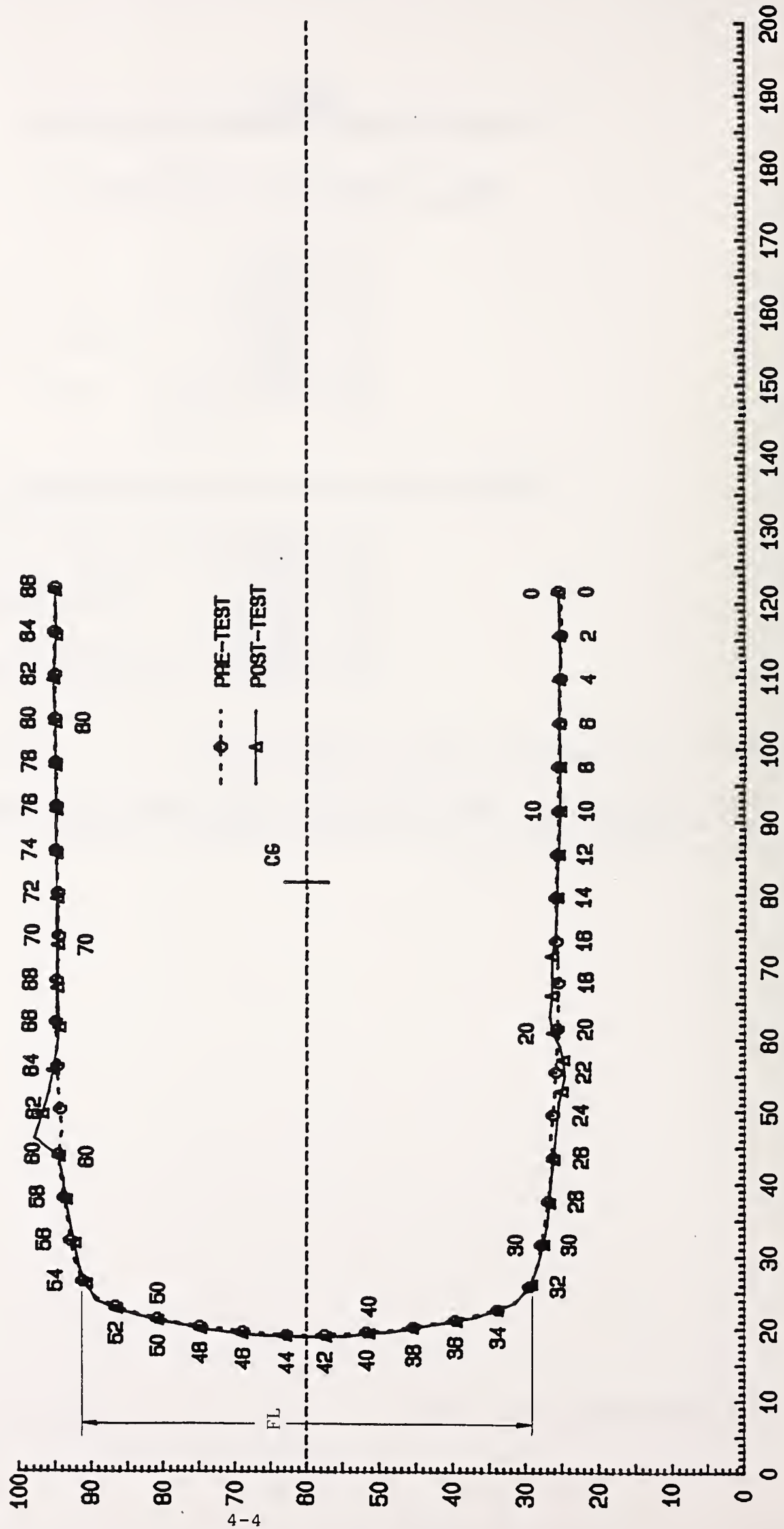


FIGURE 6

TEST 2 - VEHICLE CRUSH PROFILE AT UNDERRIDE GUARD BUMPER HEIGHT

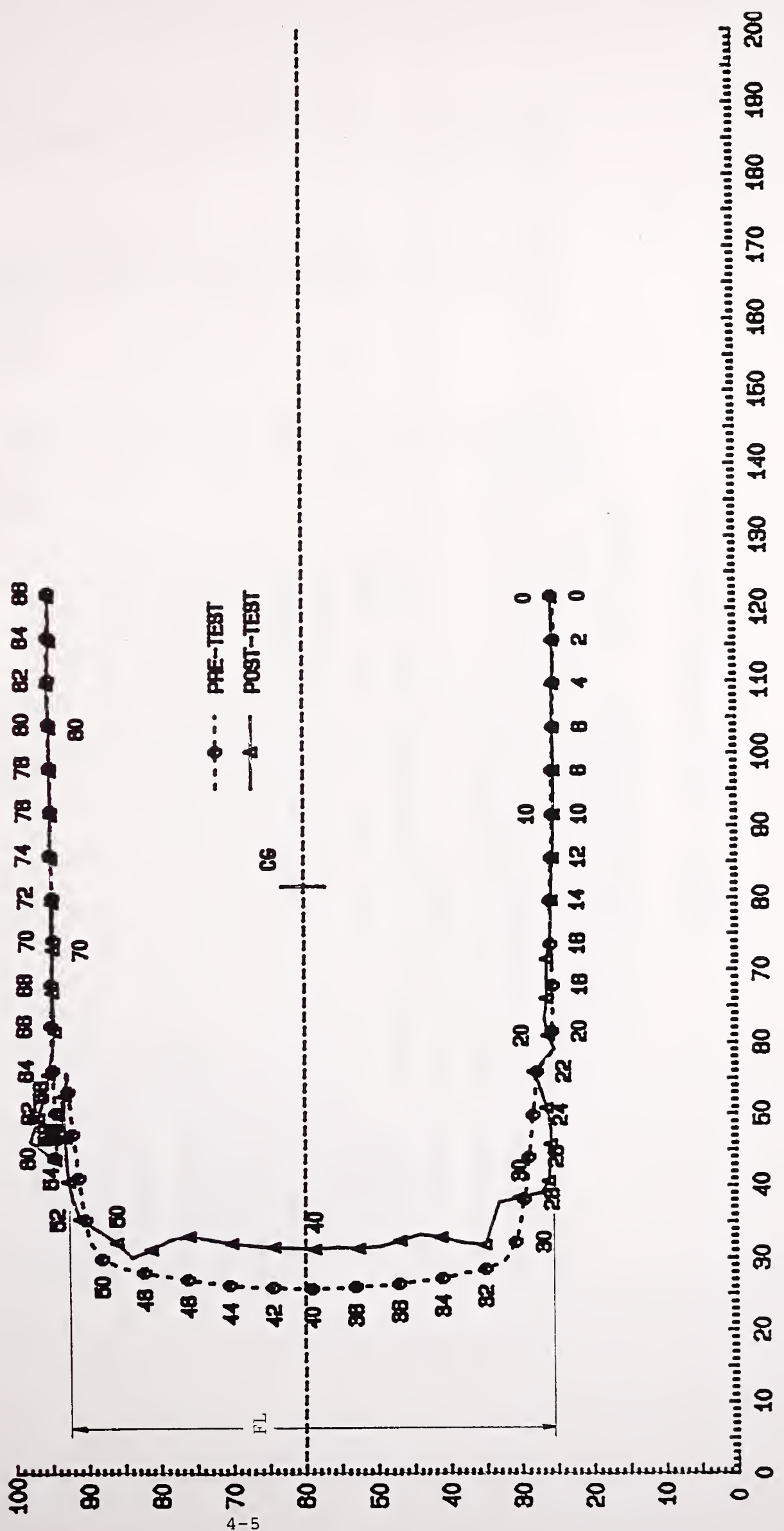


TABLE 11

TEST NO. 930603-2 VEHICLE MEASUREMENTS

VEHICLE MAKE/MODEL: Ford/Taurus

NO.	TYPE OF MEASUREMENT	PRE-TEST	POST-TEST	DIFF.
X1	TOTAL LENGTH OF VEHICLE AT CENTERLINE	188.2	188.2	0.0
X2	REAR SURFACE OF VEHICLE TO FRONT OF ENGINE BLOCK	NA	NA	NA
X3	REAR SURFACE OF VEHICLE TO FIREWALL	NA	NA	NA
X4	REAR SURFACE OF VEHICLE TO UPPER LEADING EDGE OF RIGHT DOOR	130.2	130.1	-0.1
X5	REAR SURFACE OF VEHICLE TO UPPER LEADING EDGE OF LEFT DOOR	130.2	130.2	0.0
X6	REAR SURFACE OF VEHICLE TO LOWER LEADING EDGE OF RIGHT DOOR	127.8	127.9	-0.1
X7	REAR SURFACE OF VEHICLE TO LOWER LEADING EDGE OF LEFT DOOR	128.0	127.8	0.2
X8	REAR SURFACE OF VEHICLE TO UPPER TRAILING EDGE OF RIGHT DOOR	87.6	87.4	0.2
X9	REAR SURFACE OF VEHICLE TO UPPER TRAILING EDGE OF LEFT DOOR	87.4	87.4	0.0
X10	REAR SURFACE OF VEHICLE TO LOWER TRAILING EDGE OF RIGHT DOOR	86.8	86.8	0.0
X11	REAR SURFACE OF VEHICLE TO LOWER TRAILING EDGE OF LEFT DOOR	87.1	86.9	0.2
X12	REAR SURFACE OF VEHICLE TO BOTTOM OF "A" POST ON RIGHT SIDE	126.8	127.0	-0.2
X13	REAR SURFACE OF VEHICLE TO BOTTOM OF "A" POST ON LEFT SIDE	NA	NA	NA
X14	REAR SURFACE OF VEHICLE TO FIREWALL - RIGHT SIDE	NA	NA	NA
X15	REAR SURFACE OF VEHICLE TO FIREWALL - LEFT SIDE	NA	NA	NA
X16	REAR SURFACE OF VEHICLE TO STEERING WHEEL CENTER	111.6	111.5	0.1
X17	CENTER OF STEERING COLUMN TO "A" POST	10.9	11.5	-0.6
X18	CENTER OF STEERING COLUMN TO HEADLINER	16.4	16.2	0.2
X19	REAR SURFACE OF VEHICLE TO RIGHT SIDE OF FRONT BUMPER	184.4	184.3	0.1
X20	REAR SURFACE OF VEHICLE TO LEFT SIDE OF FRONT BUMPER	184.4	184.4	0.0
X21	LENGTH OF ENGINE BLOCK	15.0	15.0	0.0

All distance measurements are in inches.

TABLE 12

## VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY

TEST NUMBER 930603-2

No. LOCATION	X*	Y*	Z*	POSITIVE DIRECTION		NEGATIVE DIRECTION	
				MAX G MSEC		MAX G MSEC	
1 LEFT REAR SILL	71.4	29.3	18.2				
LONGITUDINAL				1.2	210.3	13.2	78.1
LATERAL				3.3	89.3	1.4	58.0
2 RIGHT REAR SILL	71.9	-29.0	19.0				
LONGITUDINAL				0.9	209.4	18.0	74.0
LATERAL				3.3	85.9	1.1	72.5
3 VEHICLE CENTER	111.9	0.0	15.9				
OF GRAVITY							
LONGITUDINAL				1.0	185.5	16.9	73.5
LATERAL				3.4	84.1	0.8	144.3
RESULTANT				16.9	73.5		

\* ALL MEASUREMENTS OF ACCELEROMETER LOCATIONS ARE IN INCHES.

REFERENCE: X: + FORWARD FROM VEHICLE'S REAR BUMPER

Y: + LEFTWARD FROM VEHICLE'S LONGITUDINAL CENTERLINE

Z: + UPWARD FROM GROUND LEVEL

TABLE 13  
TEST NO. 930603-2 CAMERA INFORMATION

CAMERA NUMBER	LOCATION	TYPE	LENS (mm)	SPEED (fps)	PURPOSE OF CAMERA DATA
1	Left tight	Photosonic	25	1015	Impact overall
2	Right wide	Photosonic	13	1002	Impact overall

SECTION 5.0

TEST 930603-3 SUMMARY



TABLE 14

TEST NO. 930603-3 TEST CONDITIONS

DATE OF TEST: 06/03/93

TIME OF TEST: 1512 .

AMBIENT TEMPERATURE AT IMPACT AREA: 66° F

INTENDED IMPACT VELOCITY: 15.0 MPH

ACTUAL IMPACT VELOCITY: PRIMARY = 15.0 MPH  
SECONDARY = 15.0 MPH

SUBJECT VEHICLE DATA

LENGTH OF DIRECT CONTACT DAMAGE: 64.8 IN.

MAXIMUM CUMULATIVE CRUSH AT  
VEHICLE BUMPER HEIGHT: 0.4 IN.

MAXIMUM CUMULATIVE CRUSH AT  
UNDERRIDE GUARD BUMPER HEIGHT: 10.5 IN.

VEHICLE ATTITUDES:

POST-TEST: LF: 36.0; RF: 30.5; LR: 27.6; RR: 26.8

All distance measurements are in inches.

TABLE 15  
TEST NO. 930603-3 VEHICLE CRUSH MEASUREMENTS

VEHICLE BUMPER HEIGHT MEASUREMENTS

FL	<u>62.1</u>
C1	<u>0.2</u>
C2	<u>0.0</u>
C3	<u>-0.2</u>
C4	<u>-0.1</u>
C5	<u>0.0</u>
C6	<u>0.1</u>

UNDERRIDE GUARD BUMPER HEIGHT MEASUREMENTS

FL	<u>65.0</u>
C1	<u>5.0</u>
C2	<u>8.4</u>
C3	<u>9.0</u>
C4	<u>9.2</u>
C5	<u>10.5</u>
C6	<u>0.0</u>

NOTE: FL is post-test length of damage surface.

Measurements C1 - C6 were spaced equally apart over the post-impact length of the vehicle front. This distance is defined as length "FL" on the vehicle crush profile plot.

All measurements are in inches.

FIGURE 7

TEST 3 - VEHICLE CRUSH PROFILE AT VEHICLE BUMPER HEIGHT

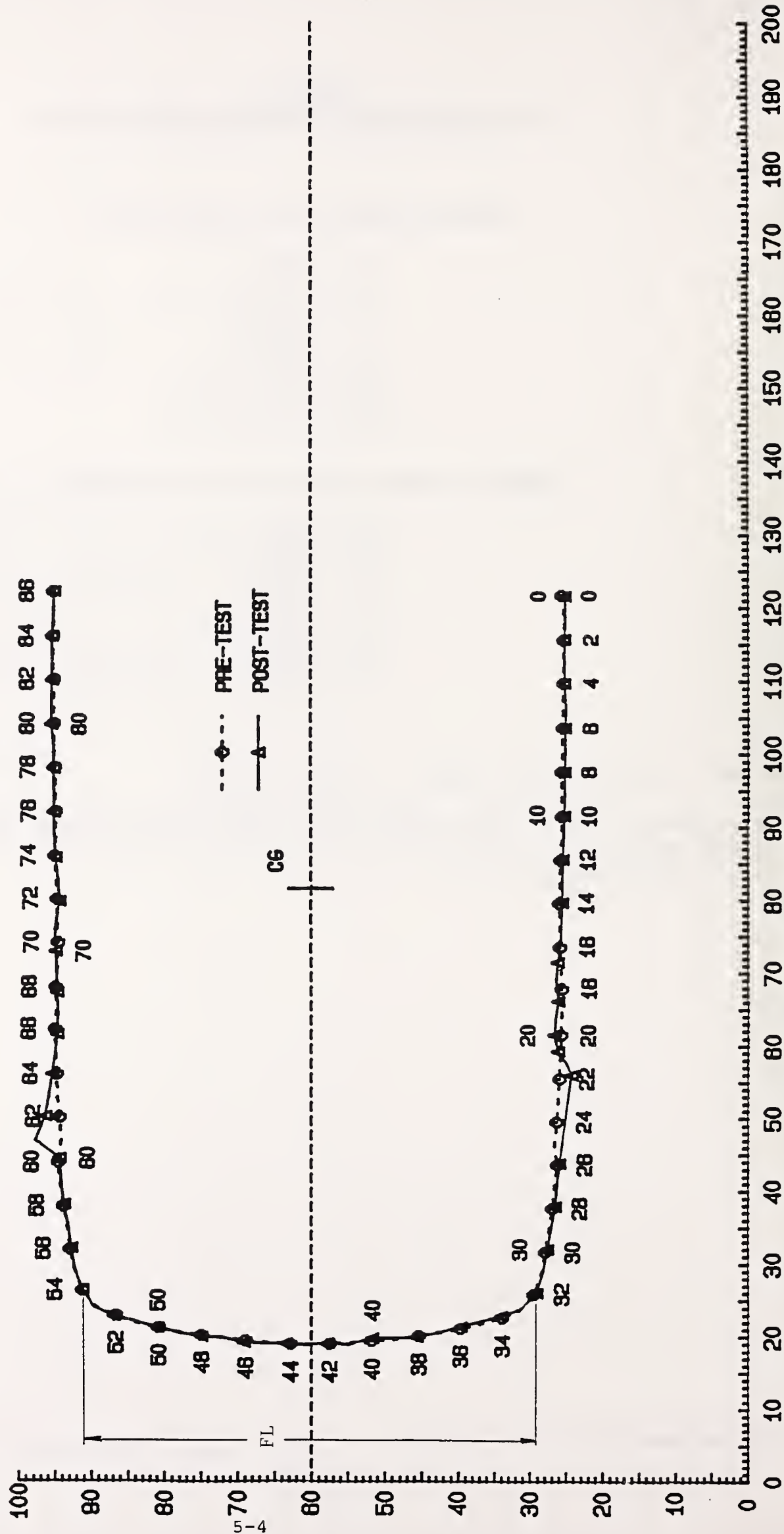


FIGURE 8

TEST 3 - VEHICLE CRUSH PROFILE AT UNDERRIDE GUARD BUMPER HEIGHT

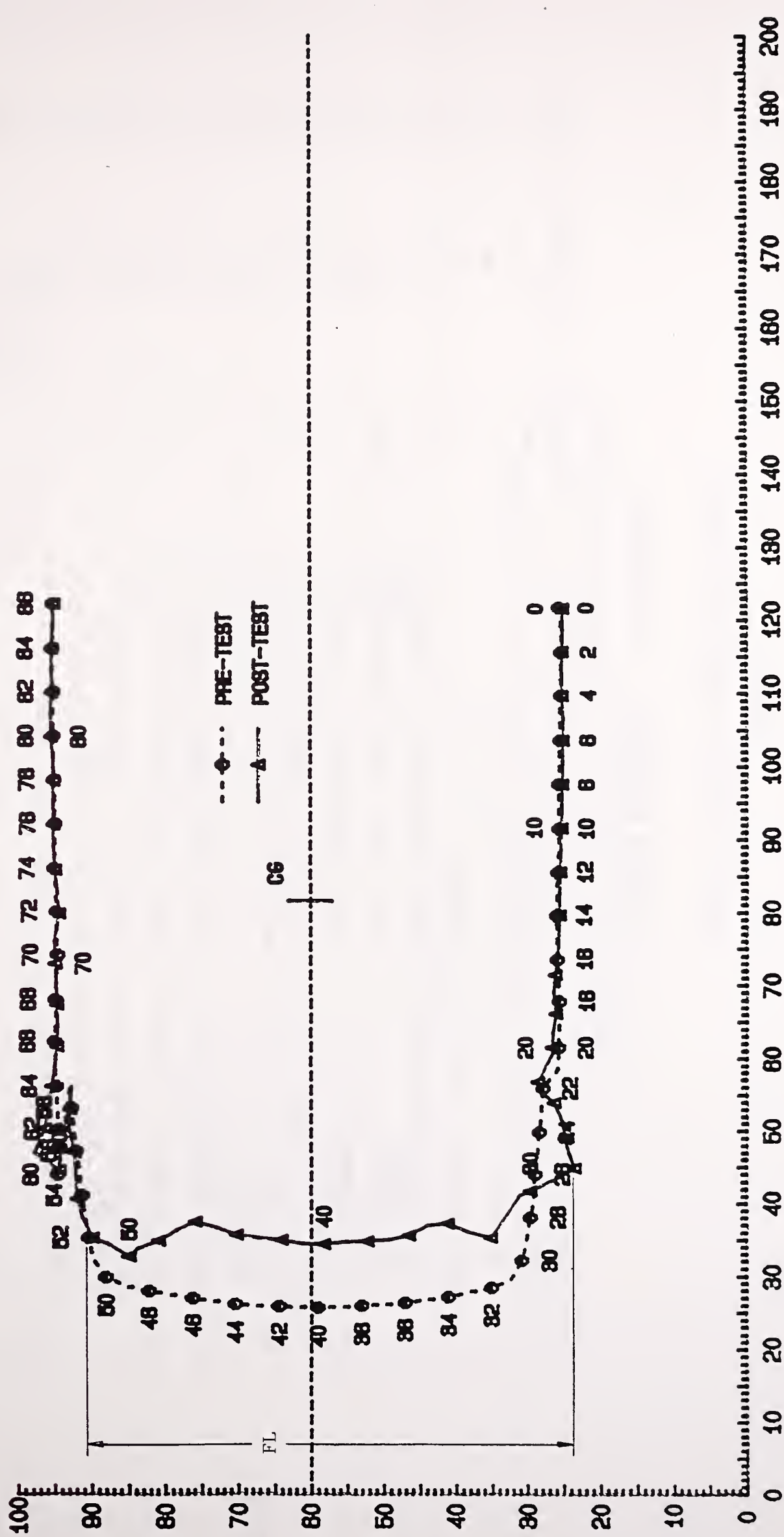


TABLE 16

## TEST NO. 930603-3 VEHICLE MEASUREMENTS

VEHICLE MAKE/MODEL: Ford/Taurus

NO.	TYPE OF MEASUREMENT	PRE-TEST	POST-TEST	DIFF.
X1	TOTAL LENGTH OF VEHICLE AT CENTERLINE	188.2	188.0	0.2
X2	REAR SURFACE OF VEHICLE TO FRONT OF ENGINE BLOCK	NA	NA	NA
X3	REAR SURFACE OF VEHICLE TO FIREWALL	NA	NA	NA
X4	REAR SURFACE OF VEHICLE TO UPPER LEADING EDGE OF RIGHT DOOR	130.1	130.2	-0.1
X5	REAR SURFACE OF VEHICLE TO UPPER LEADING EDGE OF LEFT DOOR	130.2	130.2	0.0
X6	REAR SURFACE OF VEHICLE TO LOWER LEADING EDGE OF RIGHT DOOR	127.9	127.4	0.5
X7	REAR SURFACE OF VEHICLE TO LOWER LEADING EDGE OF LEFT DOOR	127.8	127.8	0.0
X8	REAR SURFACE OF VEHICLE TO UPPER TRAILING EDGE OF RIGHT DOOR	87.4	87.7	-0.3
X9	REAR SURFACE OF VEHICLE TO UPPER TRAILING EDGE OF LEFT DOOR	87.4	87.5	-0.1
X10	REAR SURFACE OF VEHICLE TO LOWER TRAILING EDGE OF RIGHT DOOR	86.8	86.6	0.2
X11	REAR SURFACE OF VEHICLE TO LOWER TRAILING EDGE OF LEFT DOOR	86.9	86.9	0.0
X12	REAR SURFACE OF VEHICLE TO BOTTOM OF "A" POST ON RIGHT SIDE	127.0	127.0	0.0
X13	REAR SURFACE OF VEHICLE TO BOTTOM OF "A" POST ON LEFT SIDE	NA	NA	NA
X14	REAR SURFACE OF VEHICLE TO FIREWALL - RIGHT SIDE	NA	NA	NA
X15	REAR SURFACE OF VEHICLE TO FIREWALL - LEFT SIDE	NA	NA	NA
X16	REAR SURFACE OF VEHICLE TO STEERING WHEEL CENTER	111.5	110.3	1.2
X17	CENTER OF STEERING COLUMN TO "A" POST	11.5	9.8	1.7
X18	CENTER OF STEERING COLUMN TO HEADLINER	16.2	16.6	-0.4
X19	REAR SURFACE OF VEHICLE TO RIGHT SIDE OF FRONT BUMPER	184.3	184.0	0.3
X20	REAR SURFACE OF VEHICLE TO LEFT SIDE OF FRONT BUMPER	184.4	184.0	0.4
X21	LENGTH OF ENGINE BLOCK	15.0	15.0	0.0

All distance measurements are in inches.



TABLE 17

## VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY

TEST NUMBER 930603-3

No. LOCATION	X*	Y*	Z*	POSITIVE DIRECTION		NEGATIVE DIRECTION	
				MAX G	MSEC	MAX G	MSEC
1 LEFT REAR SILL	71.4	29.3	18.2				
LONGITUDINAL				0.7	220.9	18.0	86.1
LATERAL				4.8	93.4	1.8	99.3
2 RIGHT REAR SILL	71.9	-29.0	19.0				
LONGITUDINAL				0.7	152.5	21.5	83.5
LATERAL				3.9	85.6	1.4	112.1
3 VEHICLE CENTER OF GRAVITY	111.9	0.0	15.9				
LONGITUDINAL				0.8	219.0	20.5	96.3
LATERAL				5.0	94.8	1.5	178.1
RESULTANT				20.8	96.1		

\* ALL MEASUREMENTS OF ACCELEROMETER LOCATIONS ARE IN INCHES.

REFERENCE: X: + FORWARD FROM VEHICLE'S REAR BUMPER

Y: + LEFTWARD FROM VEHICLE'S LONGITUDINAL CENTERLINE

Z: + UPWARD FROM GROUND LEVEL

TABLE 18  
TEST NO. 930603-3 CAMERA INFORMATION

CAMERA NUMBER	LOCATION	TYPE	LENS (mm)	SPEED (fps)	PURPOSE OF CAMERA DATA
1	Left tight	Photosonic	25	1015	Impact overall
2	Right wide	Photosonic	13	1005	Impact overall

SECTION 6.0

TEST 930603-4 SUMMARY

TABLE 19

TEST NO. 930603-4 TEST CONDITIONS

DATE OF TEST: 06/03/93

TIME OF TEST: 1711

AMBIENT TEMPERATURE AT IMPACT AREA: 66° F

INTENDED IMPACT VELOCITY: 35.0 MPH

ACTUAL IMPACT VELOCITY: PRIMARY = 34.7 MPH  
SECONDARY = 34.8 MPH

SUBJECT VEHICLE DATA

LENGTH OF DIRECT CONTACT DAMAGE: 64.3 IN.

MAXIMUM CUMULATIVE CRUSH AT  
VEHICLE BUMPER HEIGHT: 6.1 IN.

MAXIMUM CUMULATIVE CRUSH AT  
UNDERRIDE GUARD BUMPER HEIGHT: 28.3 IN.

VEHICLE ATTITUDES:

POST-TEST: LF: 34.5; RF: 32.8; LR: 27.6; RR: 26.8

All distance measurements are in inches.

TABLE 20  
TEST NO. 930603-4

VEHICLE BUMPER HEIGHT MEASUREMENTS

FL	<u>65.4</u>
C1	<u>6.1</u>
C2	<u>5.6</u>
C3	<u>4.8</u>
C4	<u>4.3</u>
C5	<u>3.5</u>
C6	<u>0.1</u>

UNDERRIDE GUARD BUMPER HEIGHT MEASUREMENTS

FL	<u>62.2</u>
C1	<u>15.7</u>
C2	<u>27.7</u>
C3	<u>25.7</u>
C4	<u>26.6</u>
C5	<u>8.1</u>
C6	<u>0.6</u>

NOTE: FL is post-test length of damage surface.

Measurements C1 - C6 were spaced equally apart over the post-impact length of the vehicle front. This distance is defined as length "FL" on the vehicle crush profile plot.

All measurements are in inches.

FIGURE 9

TEST 4 - VEHICLE CRUSH PROFILE AT VEHICLE BUMPER HEIGHT

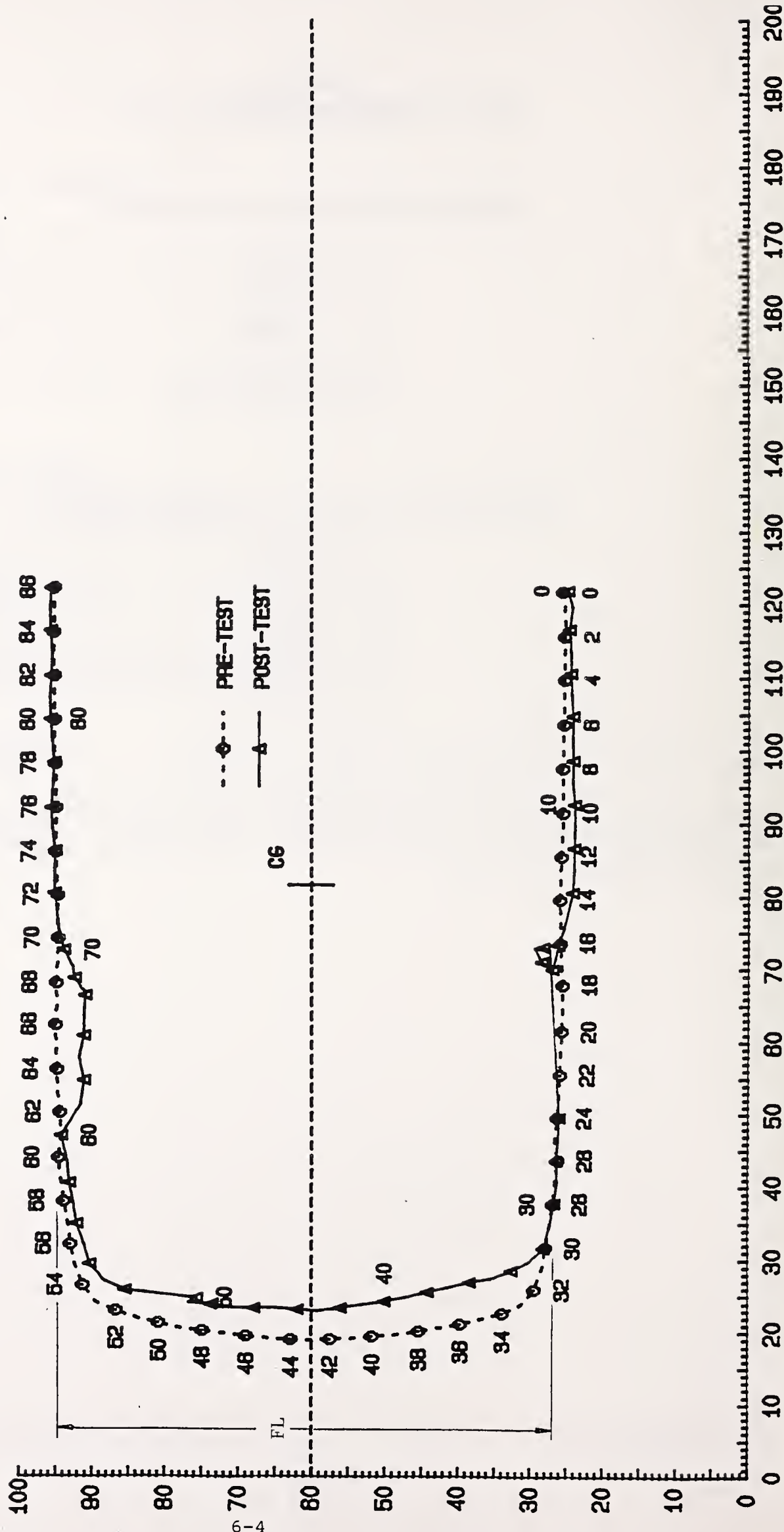




FIGURE 10

TEST 4 - VEHICLE CRUSH PROFILE AT UNDERRIDE GUARD BUMPER HEIGHT

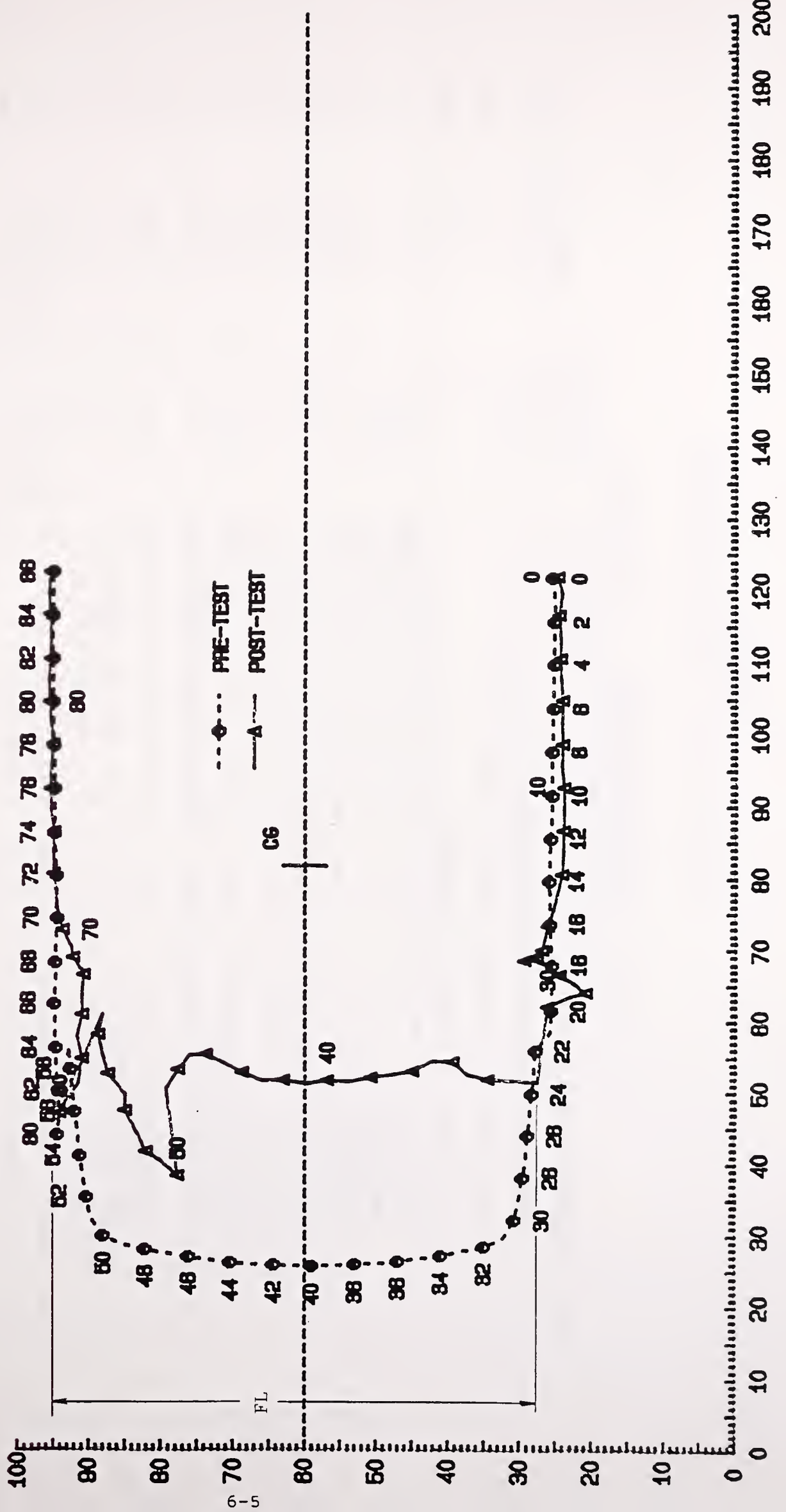


TABLE 21

TEST NO. 930603-4 VEHICLE MEASUREMENTS

VEHICLE MAKE/MODEL: Ford/Taurus

NO.	TYPE OF MEASUREMENT	PRE-TEST	POST-TEST	DIFF.
X1	TOTAL LENGTH OF VEHICLE AT CENTERLINE	188.0	183.9	4.1
X2	REAR SURFACE OF VEHICLE TO FRONT OF ENGINE BLOCK	NA	NA	NA
X3	REAR SURFACE OF VEHICLE TO FIREWALL	NA	NA	NA
X4	REAR SURFACE OF VEHICLE TO UPPER LEADING EDGE OF RIGHT DOOR	130.2	130.8	-0.6
X5	REAR SURFACE OF VEHICLE TO UPPER LEADING EDGE OF LEFT DOOR	130.2	129.4	0.8
X6	REAR SURFACE OF VEHICLE TO LOWER LEADING EDGE OF RIGHT DOOR	127.4	127.5	-0.1
X7	REAR SURFACE OF VEHICLE TO LOWER LEADING EDGE OF LEFT DOOR	127.8	127.9	-0.1
X8	REAR SURFACE OF VEHICLE TO UPPER TRAILING EDGE OF RIGHT DOOR	87.7	88.0	-0.3
X9	REAR SURFACE OF VEHICLE TO UPPER TRAILING EDGE OF LEFT DOOR	87.5	87.8	-0.3
X10	REAR SURFACE OF VEHICLE TO LOWER TRAILING EDGE OF RIGHT DOOR	86.6	86.4	0.2
X11	REAR SURFACE OF VEHICLE TO LOWER TRAILING EDGE OF LEFT DOOR	86.9	86.2	0.7
X12	REAR SURFACE OF VEHICLE TO BOTTOM OF "A" POST ON RIGHT SIDE	127.0	126.7	0.3
X13	REAR SURFACE OF VEHICLE TO BOTTOM OF "A" POST ON LEFT SIDE	127.0	124.9	2.1
X14	REAR SURFACE OF VEHICLE TO FIREWALL - RIGHT SIDE	NA	NA	NA
X15	REAR SURFACE OF VEHICLE TO FIREWALL - LEFT SIDE	NA	NA	NA
X16	REAR SURFACE OF VEHICLE TO STEERING WHEEL CENTER	110.3	104.5	5.8
X17	CENTER OF STEERING COLUMN TO "A" POST	9.8	7.0	2.8
X18	CENTER OF STEERING COLUMN TO HEADLINER	16.6	24.7	-8.1
X19	REAR SURFACE OF VEHICLE TO RIGHT SIDE OF FRONT BUMPER	184.0	181.1	2.9
X20	REAR SURFACE OF VEHICLE TO LEFT SIDE OF FRONT BUMPER	184.0	178.4	5.6
X21	LENGTH OF ENGINE BLOCK	15.0	15.0	0.0

All distance measurements are in inches.

TABLE 22

## VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY

TEST NUMBER 930603-4

No. LOCATION	X*	Y*	Z*	POSITIVE		NEGATIVE	
				DIRECTION		DIRECTION	
				MAX G MSEC		MAX G MSEC	
1 LEFT REAR SILL	71.4	29.3	18.2				
LONGITUDINAL				2.2	240.4	32.2	71.8
LATERAL				6.9	62.3	3.6	98.6
2 RIGHT REAR SILL	71.9	-29.0	19.0				
LONGITUDINAL				1.6	237.9	28.7	65.4
LATERAL				4.5	61.1	4.0	78.9
3 VEHICLE CENTER	111.9	0.0	15.9				
OF GRAVITY							
LONGITUDINAL				2.6	155.3	37.5	76.6
LATERAL				9.8	73.4	4.2	77.6
RESULTANT				37.6	76.8		

\* ALL MEASUREMENTS OF ACCELEROMETER LOCATIONS ARE IN INCHES.

REFERENCE: X: + FORWARD FROM VEHICLE'S REAR BUMPER  
Y: + LEFTWARD FROM VEHICLE'S LONGITUDINAL CENTERLINE  
Z: + UPWARD FROM GROUND LEVEL

TABLE 23  
TEST NO. 930603-4 CAMERA INFORMATION

CAMERA NUMBER	LOCATION	TYPE	LENS (mm)	SPEED (fps)	PURPOSE OF CAMERA DATA
1	Left tight	Photosonic	25	1012	Impact overall
2	Right wide	Photosonic	13	1005	Impact overall

PHOTOGRAPHS

LIST OF PHOTOGRAPHS

TEST NO. 930603-1

- A-1. PRE-TEST RIGHT SIDE VIEW
- A-2. POST-TEST RIGHT SIDE VIEW
- A-3. PRE-TEST RIGHT FRONT THREE-QUARTER VIEW
- A-4. POST-TEST RIGHT FRONT THREE-QUARTER VIEW
- A-5. PRE-TEST FRONT VIEW
- A-6. POST-TEST FRONT VIEW
- A-7. PRE-TEST LEFT FRONT THREE-QUARTER VIEW
- A-8. POST-TEST LEFT FRONT THREE-QUARTER VIEW
- A-9. PRE-TEST LEFT SIDE VIEW
- A-10. POST-TEST LEFT SIDE VIEW







Figure A-1. PRE-TEST RIGHT SIDE VIEW



Figure A-2. POST-TEST RIGHT SIDE VIEW





Figure A-3. PRE-TEST RIGHT FRONT THREE-QUARTER VIEW

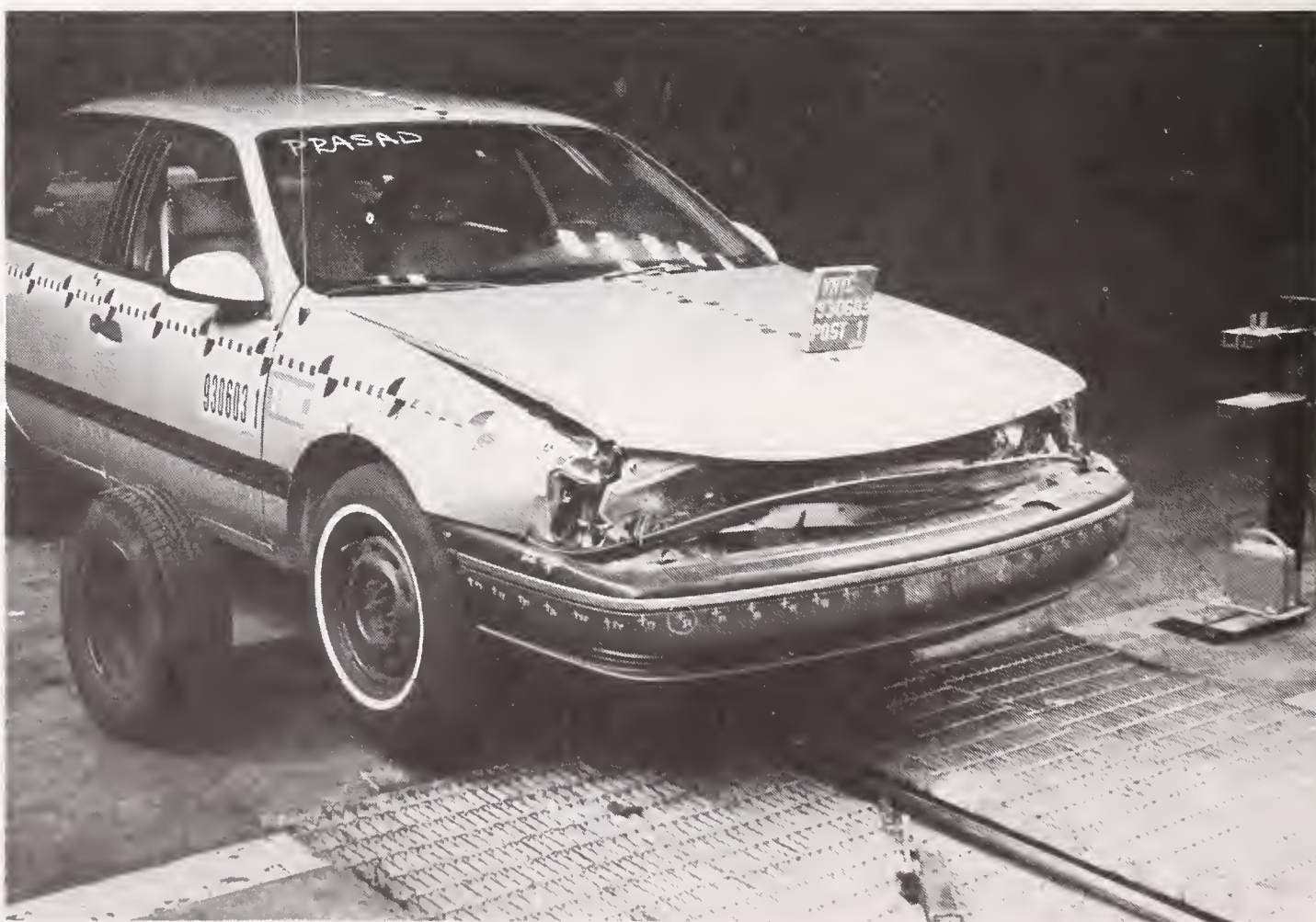


Figure A-4. POST-TEST RIGHT FRONT THREE-QUARTER VIEW



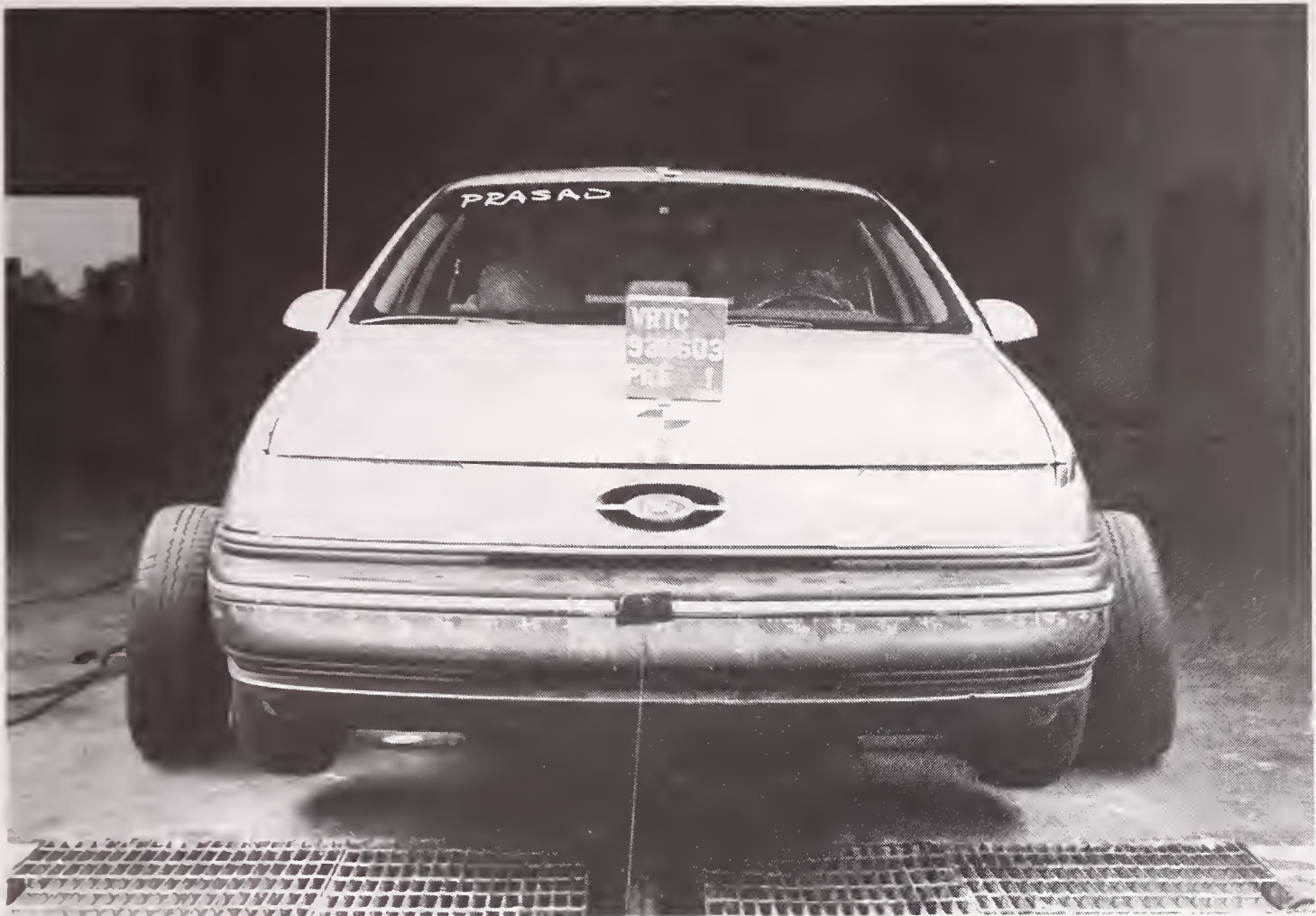


Figure A-5. PRE-TEST FRONT VIEW



Figure A-6. POST-TEST FRONT VIEW





Figure A-7. PRE-TEST LEFT FRONT THREE-QUARTER VIEW



Figure A-8. POST-TEST LEFT FRONT THREE-QUARTER VIEW





Figure A-9. PRE-TEST LEFT SIDE VIEW



Figure A-10. POST-TEST LEFT SIDE VIEW





LIST OF PHOTOGRAPHS

TEST NO. 930603-2

- A-11. PRE-TEST RIGHT SIDE VIEW
- A-12. POST-TEST RIGHT SIDE VIEW
- A-13. PRE-TEST RIGHT FRONT THREE-QUARTER VIEW
- A-14. POST-TEST RIGHT FRONT THREE-QUARTER VIEW
- A-15. PRE-TEST FRONT VIEW
- A-16. POST-TEST FRONT VIEW
- A-17. PRE-TEST LEFT FRONT THREE-QUARTER VIEW
- A-18. POST-TEST LEFT FRONT THREE-QUARTER VIEW
- A-19. PRE-TEST LEFT SIDE VIEW
- A-20. POST-TEST LEFT SIDE VIEW





Figure A-11. PRE-TEST RIGHT SIDE VIEW



Figure A-12. POST-TEST RIGHT SIDE VIEW





Figure A-13. PRE-TEST RIGHT FRONT THREE-QUARTER VIEW

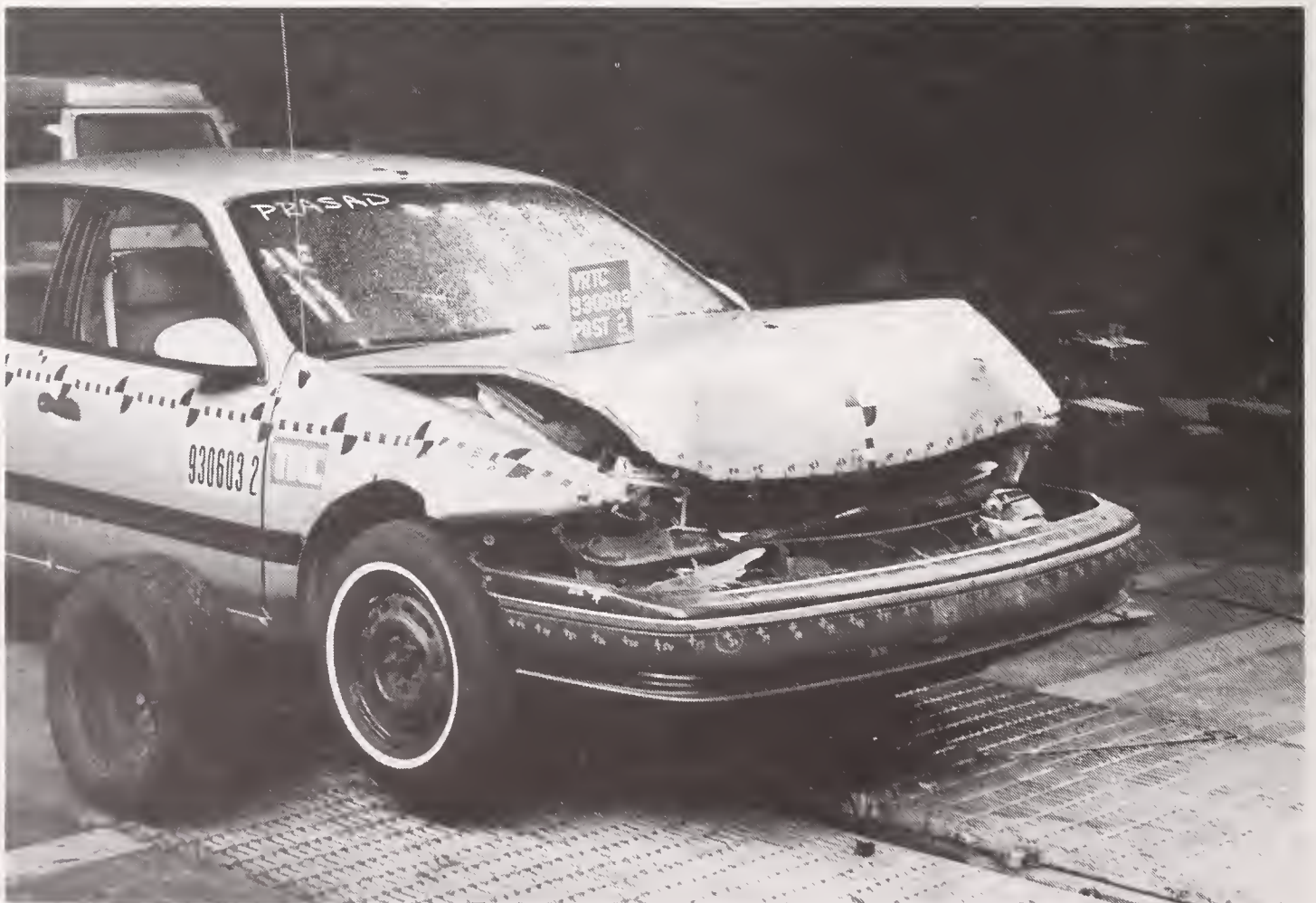


Figure A-14. POST-TEST RIGHT FRONT THREE-QUARTER VIEW





Figure A-15. PRE-TEST FRONT VIEW

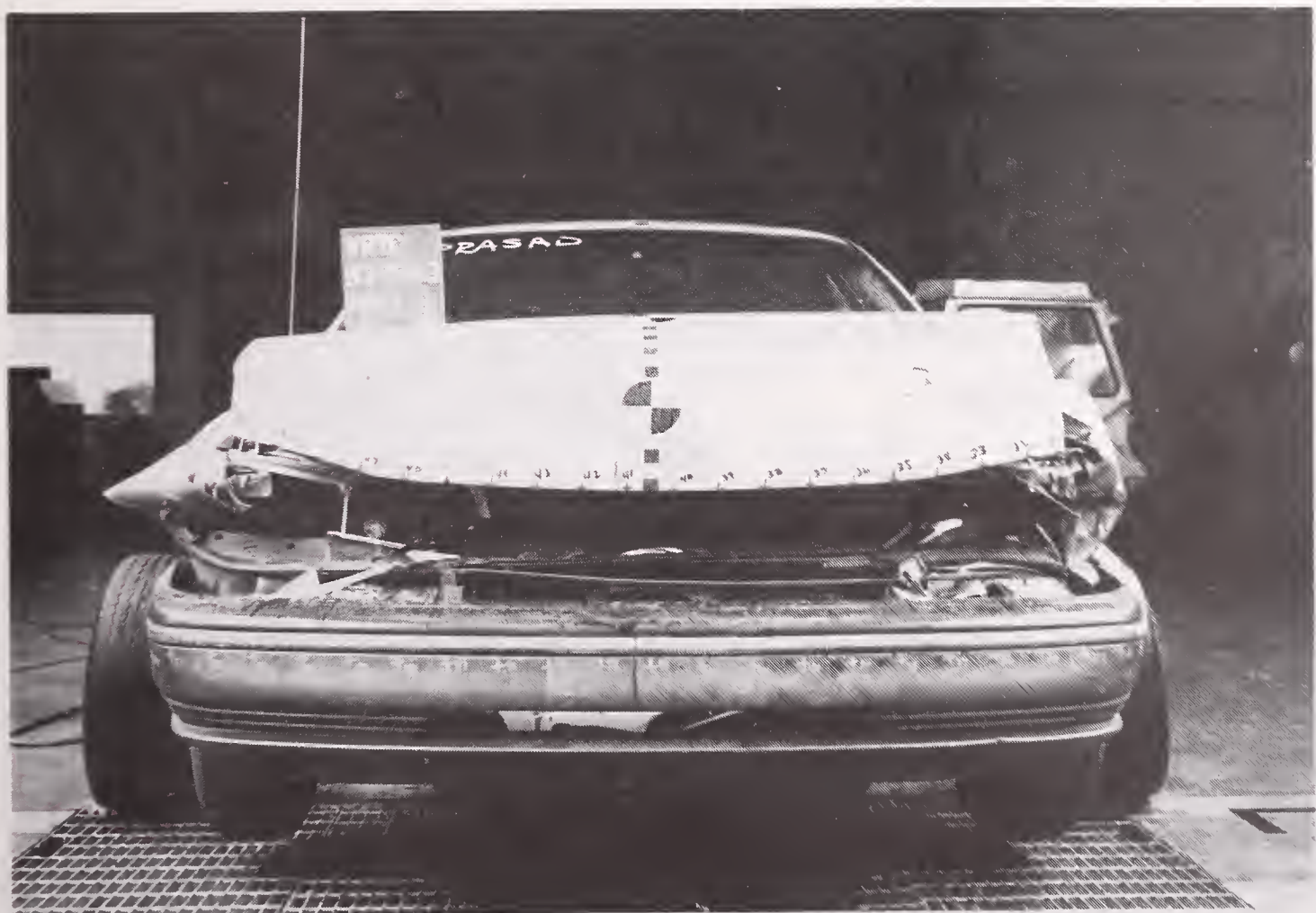


Figure A-16. POST-TEST FRONT VIEW





Figure A-17. PRE-TEST LEFT FRONT THREE-QUARTER VIEW



Figure A-18. POST-TEST LEFT FRONT THREE-QUARTER VIEW





Figure A-19. PRE-TEST LEFT SIDE VIEW



Figure A-20. POST-TEST LEFT SIDE VIEW



LIST OF PHOTOGRAPHS

TEST NO. 930603-3

- A-21. PRE-TEST RIGHT SIDE VIEW
- A-22. POST-TEST RIGHT SIDE VIEW
- A-23. PRE-TEST RIGHT FRONT THREE-QUARTER VIEW
- A-24. POST-TEST RIGHT FRONT THREE-QUARTER VIEW
- A-25. PRE-TEST FRONT VIEW
- A-26. POST-TEST FRONT VIEW
- A-27. PRE-TEST LEFT FRONT THREE-QUARTER VIEW
- A-28. POST-TEST LEFT FRONT THREE-QUARTER VIEW
- A-29. PRE-TEST LEFT SIDE VIEW
- A-30. POST-TEST LEFT SIDE VIEW







Figure A-21. PRE-TEST RIGHT SIDE VIEW



Figure A-22. POST-TEST RIGHT SIDE VIEW



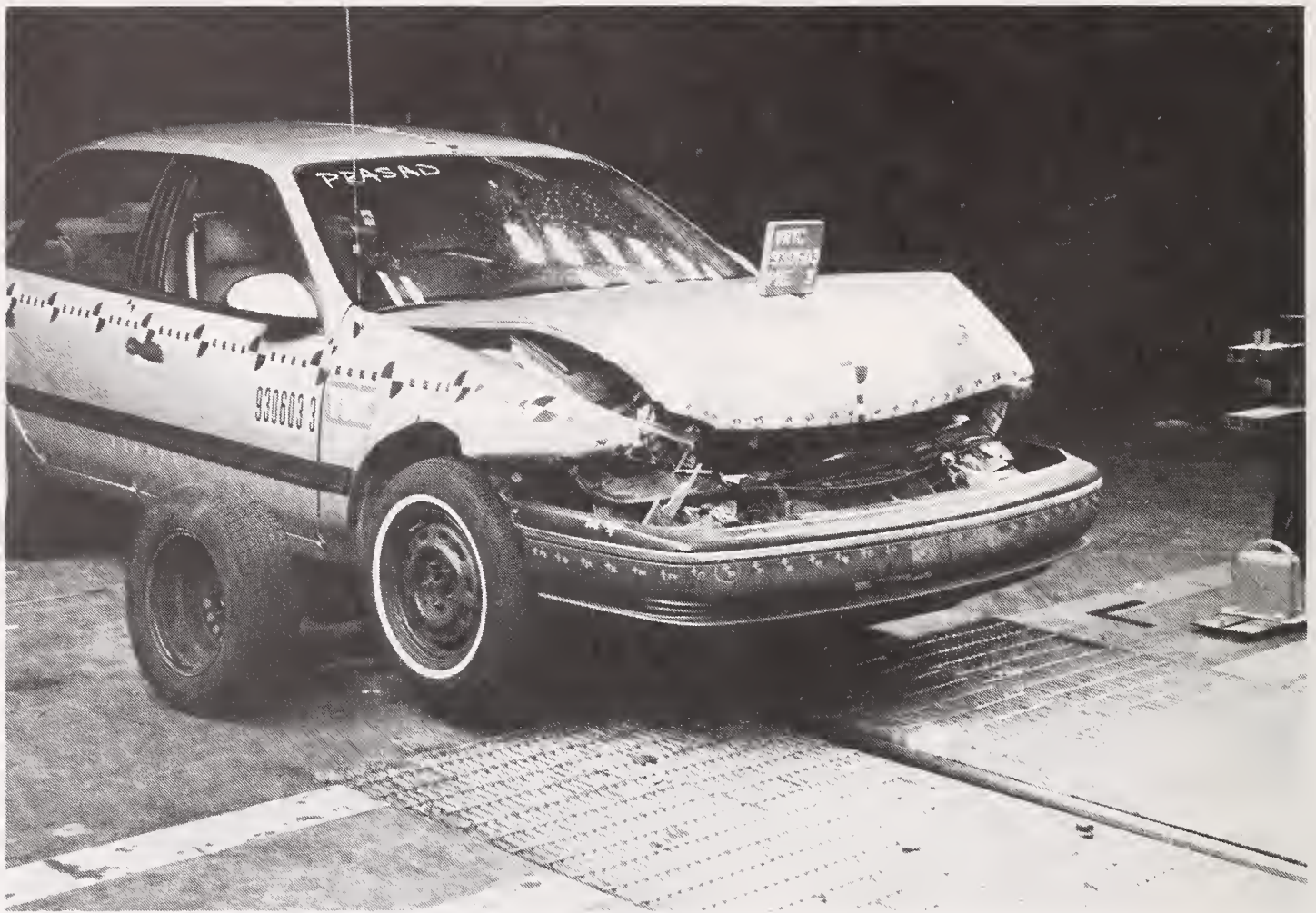


Figure A-23. PRE-TEST RIGHT FRONT THREE-QUARTER VIEW



Figure A-24. POST-TEST RIGHT FRONT THREE-QUARTER VIEW



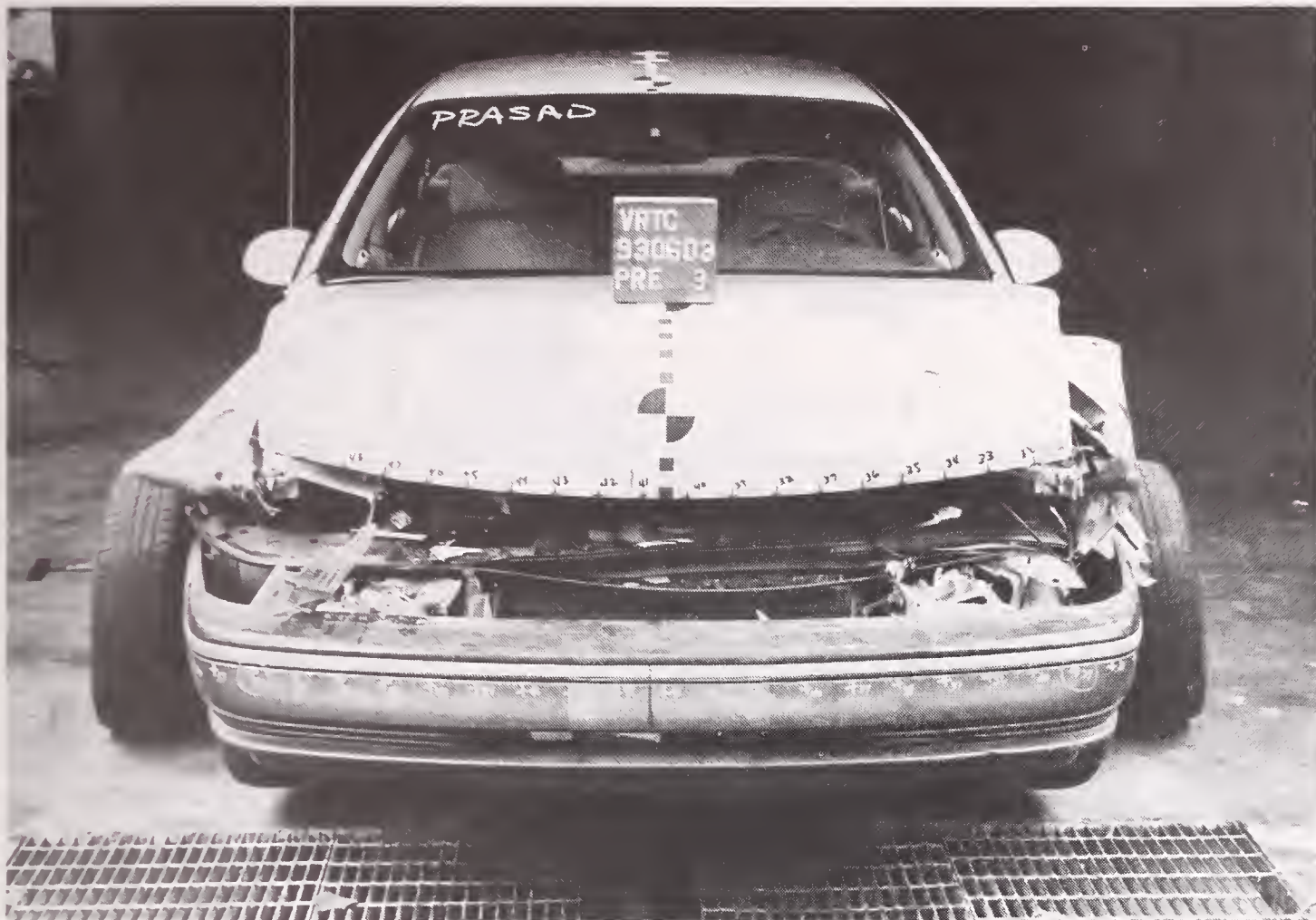


Figure A-25. PRE-TEST FRONT VIEW

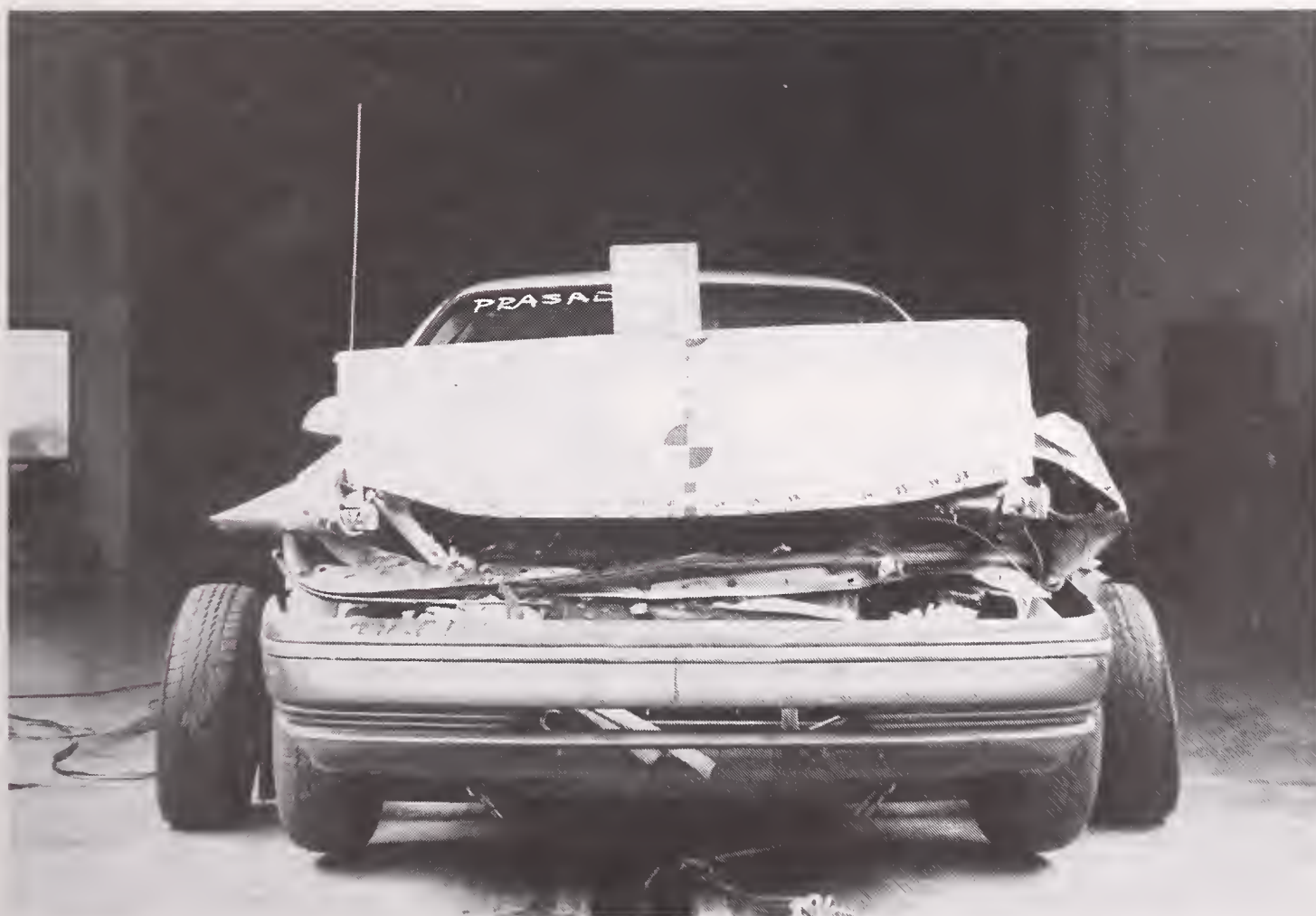


Figure A-26. POST-TEST FRONT VIEW



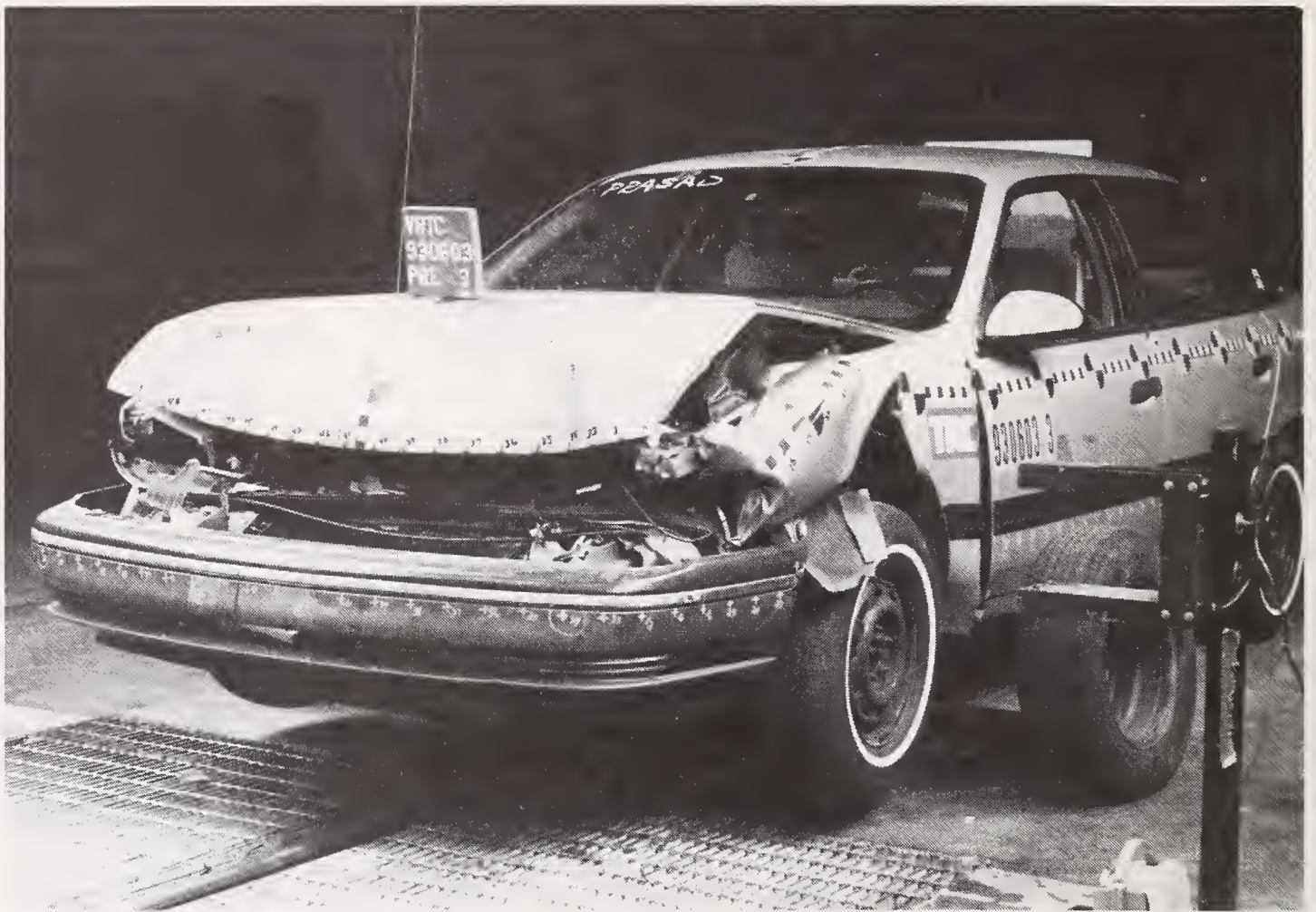


Figure A-27. PRE-TEST LEFT FRONT THREE-QUARTER VIEW



Figure A-28. POST-TEST LEFT FRONT THREE-QUARTER VIEW





Figure A-29. PRE-TEST LEFT SIDE VIEW



Figure A-30. POST-TEST LEFT SIDE VIEW



LIST OF PHOTOGRAPHS

TEST NO. 930603-4

- A-31. PRE-TEST RIGHT SIDE VIEW
- A-32. POST-TEST RIGHT SIDE VIEW
- A-33. PRE-TEST RIGHT FRONT THREE-QUARTER VIEW
- A-34. POST-TEST RIGHT FRONT THREE-QUARTER VIEW
- A-35. PRE-TEST FRONT VIEW
- A-36. POST-TEST FRONT VIEW
- A-37. PRE-TEST LEFT FRONT THREE-QUARTER VIEW
- A-38. POST-TEST LEFT FRONT THREE-QUARTER VIEW
- A-39. PRE-TEST LEFT SIDE VIEW
- A-40. POST-TEST LEFT SIDE VIEW





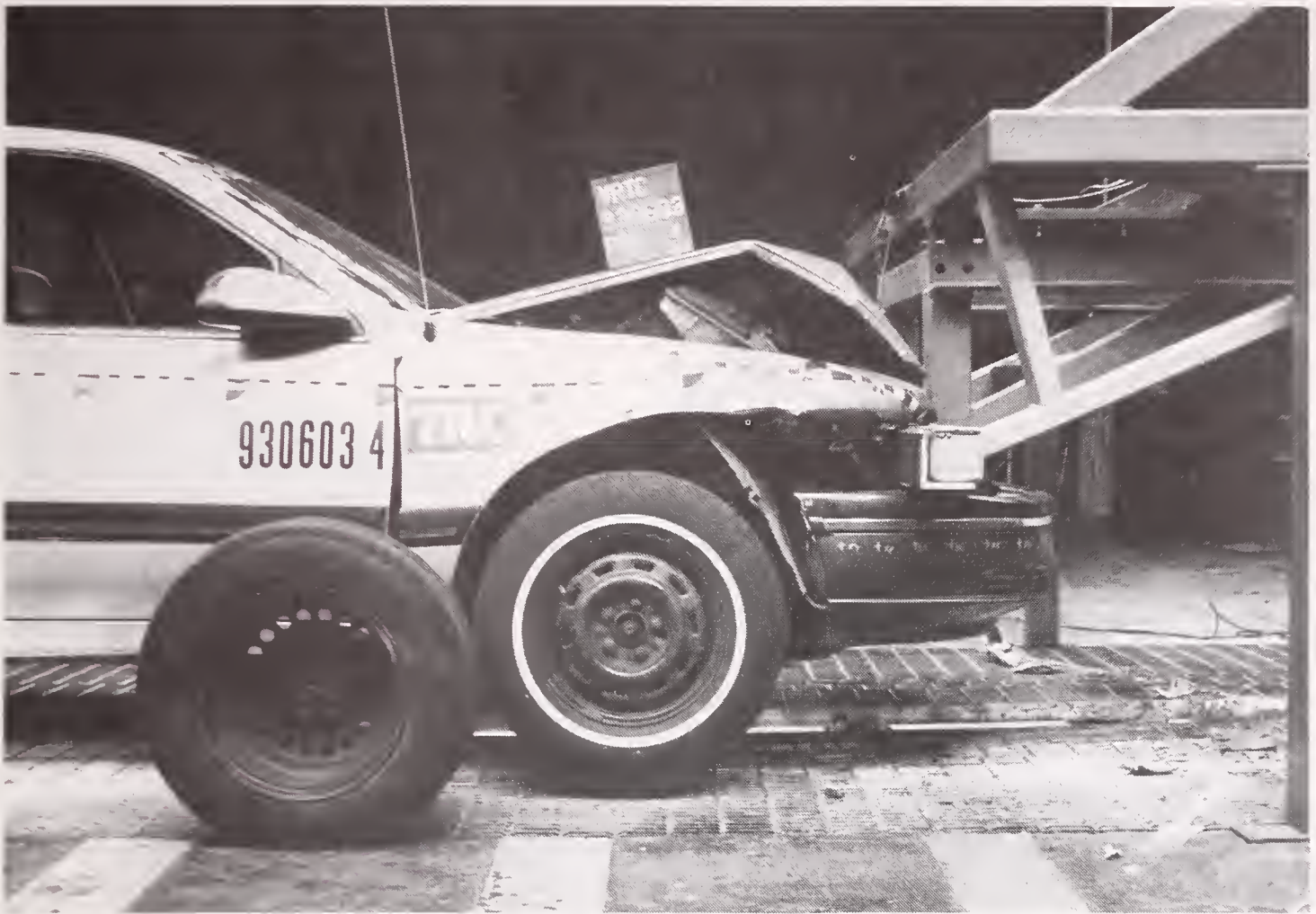


Figure A-31. PRE-TEST RIGHT SIDE VIEW



Figure A-32. POST-TEST RIGHT SIDE VIEW





Figure A-33. PRE-TEST RIGHT FRONT THREE-QUARTER VIEW



Figure A-34. POST-TEST RIGHT FRONT THREE-QUARTER VIEW





Figure A-35. PRE-TEST FRONT VIEW

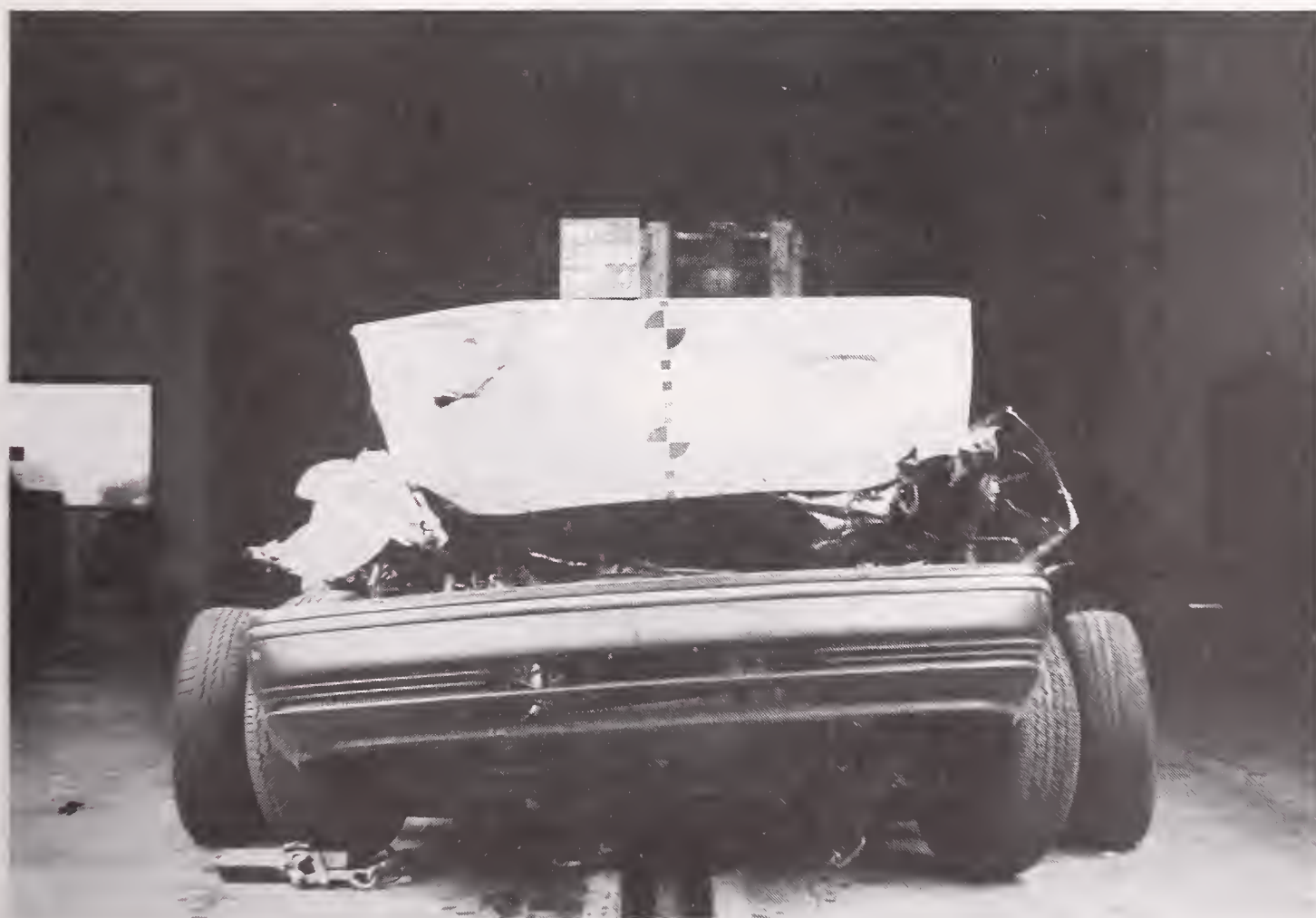


Figure A-36. POST-TEST FRONT VIEW





Figure A-37. PRE-TEST LEFT FRONT THREE-QUARTER VIEW



Figure A-38. POST-TEST LEFT FRONT THREE-QUARTER VIEW





Figure A-39. PRE-TEST LEFT SIDE VIEW



Figure A-40. POST-TEST LEFT SIDE VIEW





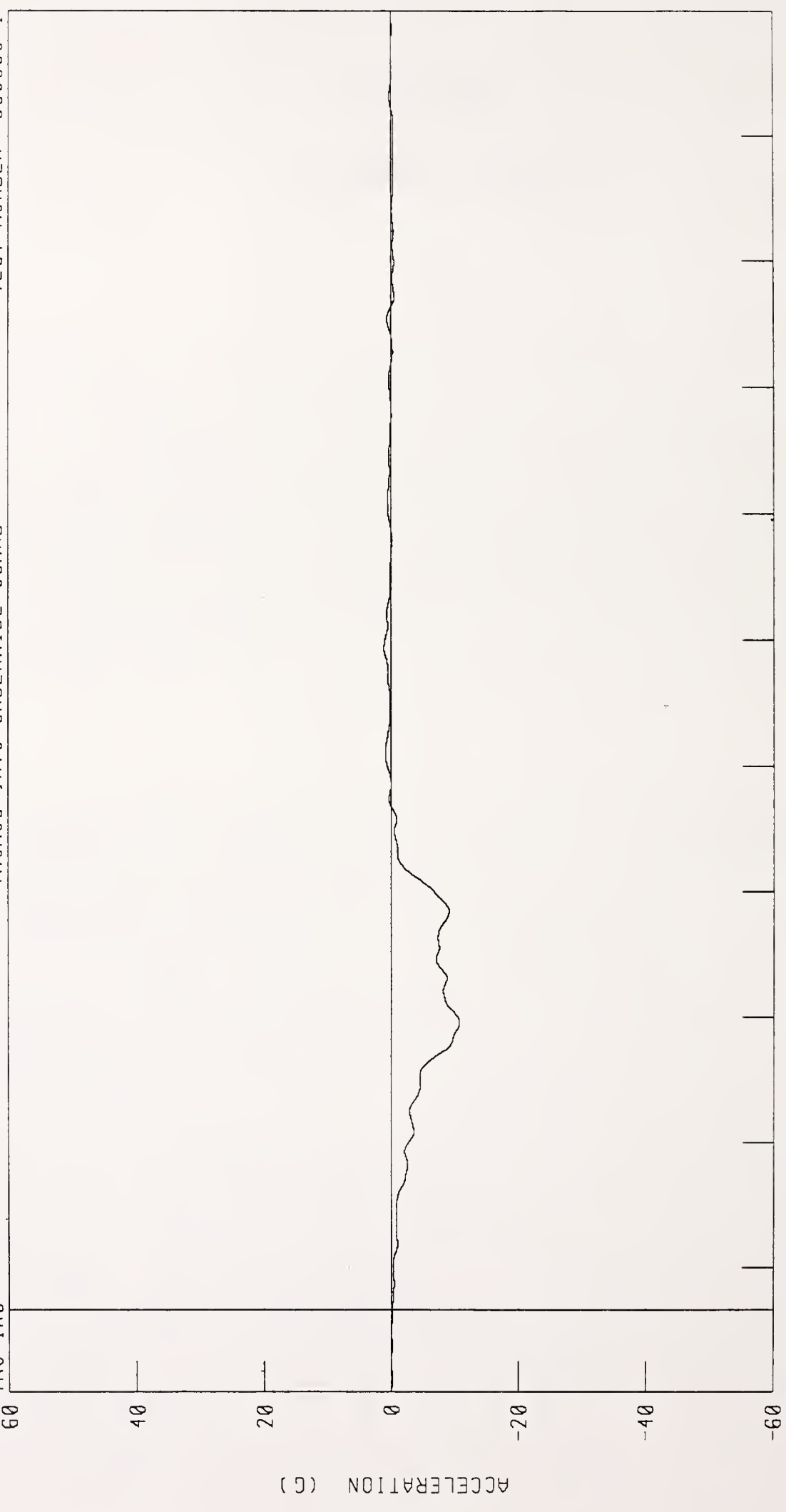
DATA PLOTS

DATA PLOTS

TEST NO. 930603-1

1990 FORD TAURUS INTO RIGID HEAVY TRUCK REAR UNDERRIDE GUARD TEST NO 1  
LEFT REAR SILL X-AXIS ACCELERATION

TRC INC  
TAURUS INTO UNDERRIDE GUARD  
TEST NUMBER 930603-1

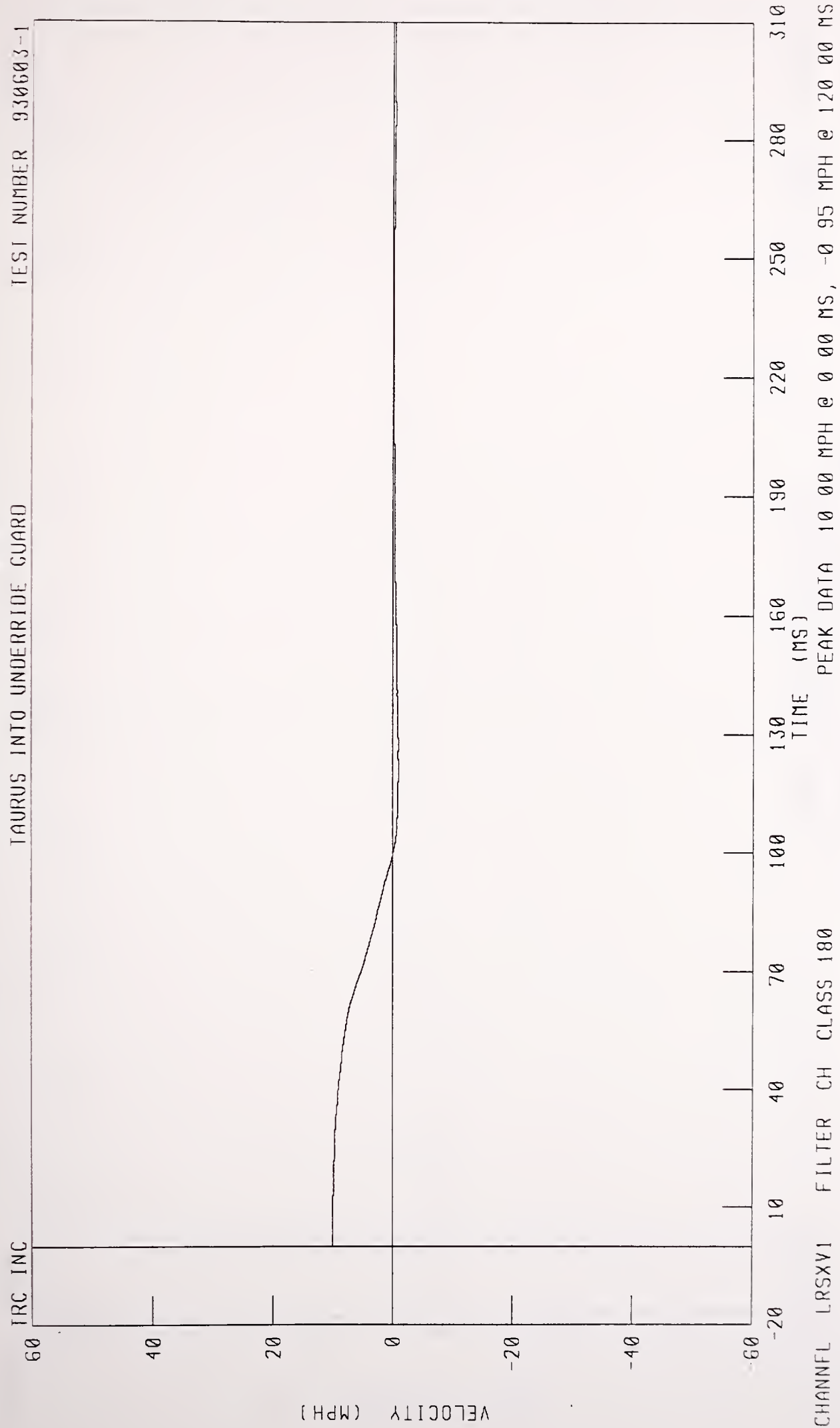


CHANNEL LRSXG1 FILTER CH CLASS 60  
PEAK DATA 1 14 G @ 158 00 MS, -10 71 G @ 68 63 MS



1990 FORD TAURUS INTO RIGID HEAVY TRUCK REAR UNDERRIDE GUARD TEST NO 1  
LEFT REAR SILL X-AXIS VELOCITY

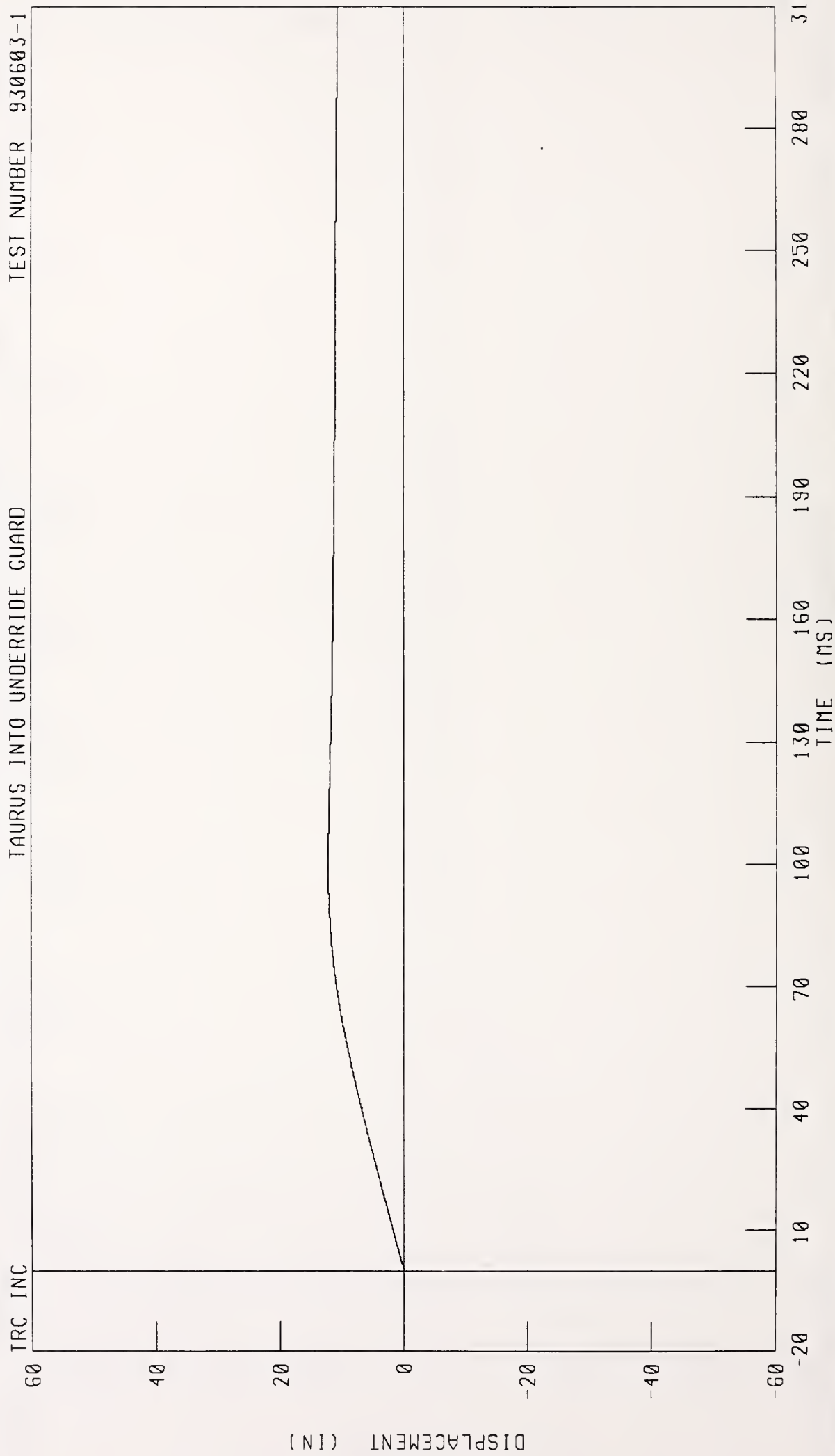
TAURUS INTO UNDERRIDE GUARD TEST NUMBER 930603-1



CHANFL LRSXV1 FILTER CH CLASS 180 PEAK DATA 10 00 MPH @ 0 00 MS, -0 95 MPH @ 120 00 MS

1990 FORD TAURUS INTO RIGID HEAVY TRUCK REAR UNDERRIDE GUARD TEST NO 1  
 LEFT REAR SILL X-AXIS DISPLACEMENT

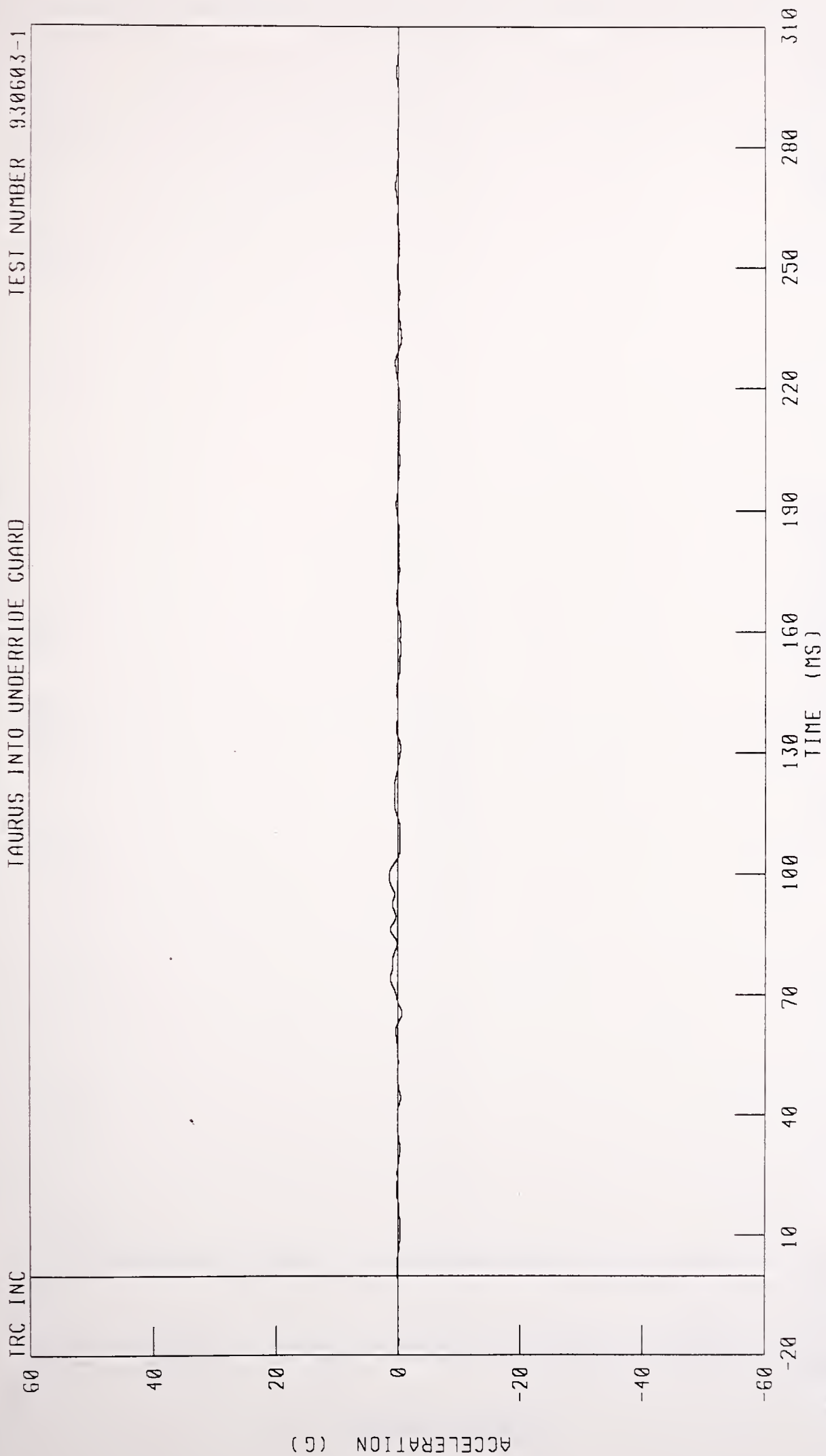
TAURUS INTO UNDERRIDE GUARD TEST NUMBER 930603-1



CHANNEL LRSXD1 FILTER CH CLASS 180 PEAK DATA 12 19 IN @ 99 25 MS, 0 00 IN @ 0 00 MS

1990 FORD TAURUS INTO RIGID HEAVY TRUCK REAR UNDERRIDE GUARD TEST NO 1  
LEFT REAR SILL Y-AXIS ACCELERATION

TAURUS INTO UNDERRIDE GUARD TEST NUMBER 930603-1



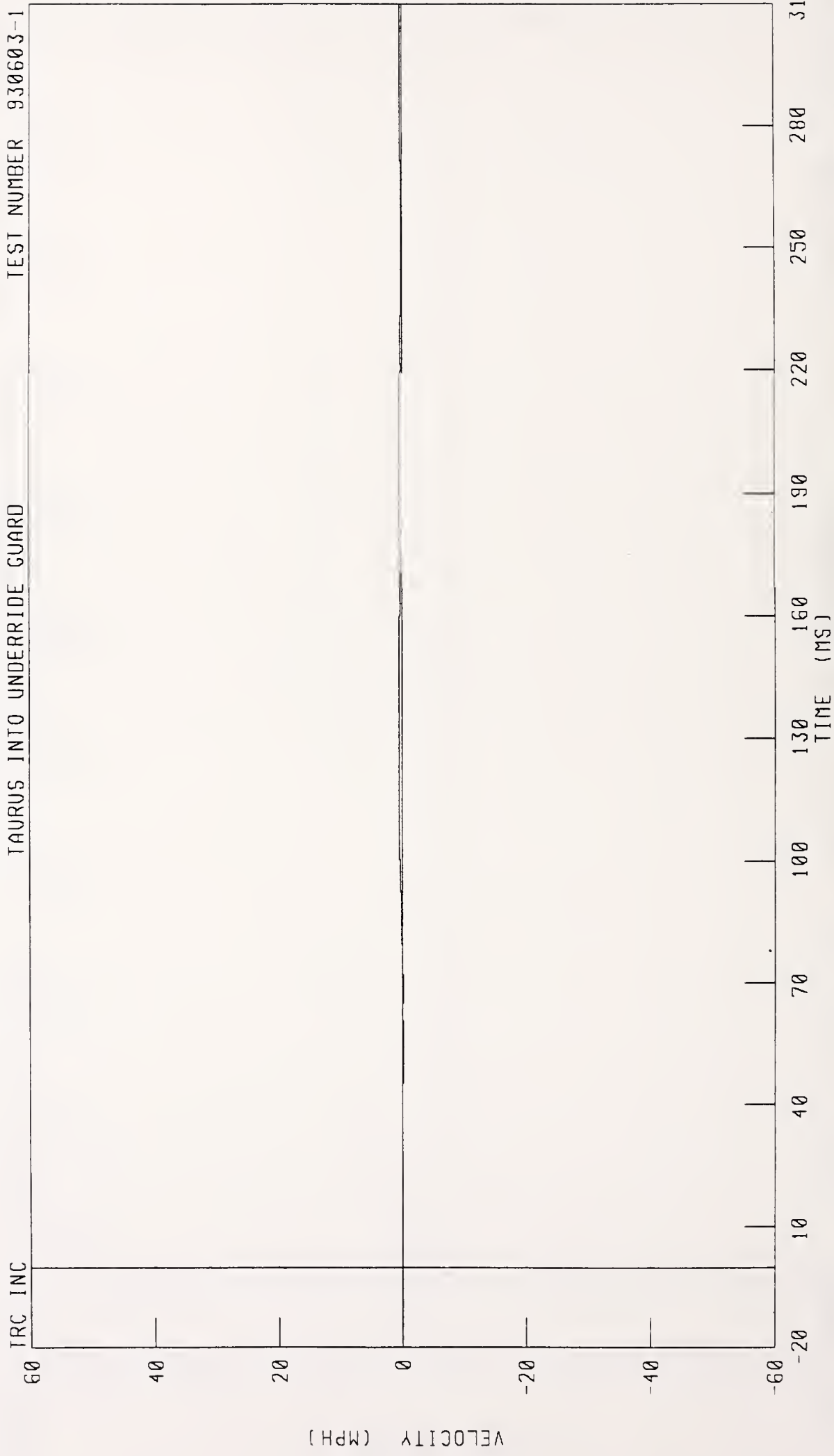
CHANNEL LRSYG1 FILTER CH CLASS 60 PEAK DATA 1 40 G @ 99 75 MS, -0 68 G @ 65 13 MS



1990 FORD TAURUS INTO RIGID HEAVY TRUCK REAR UNDERRIDE GUARD TEST NO 1

LEFT REAR SILL Y-AXIS VELOCITY

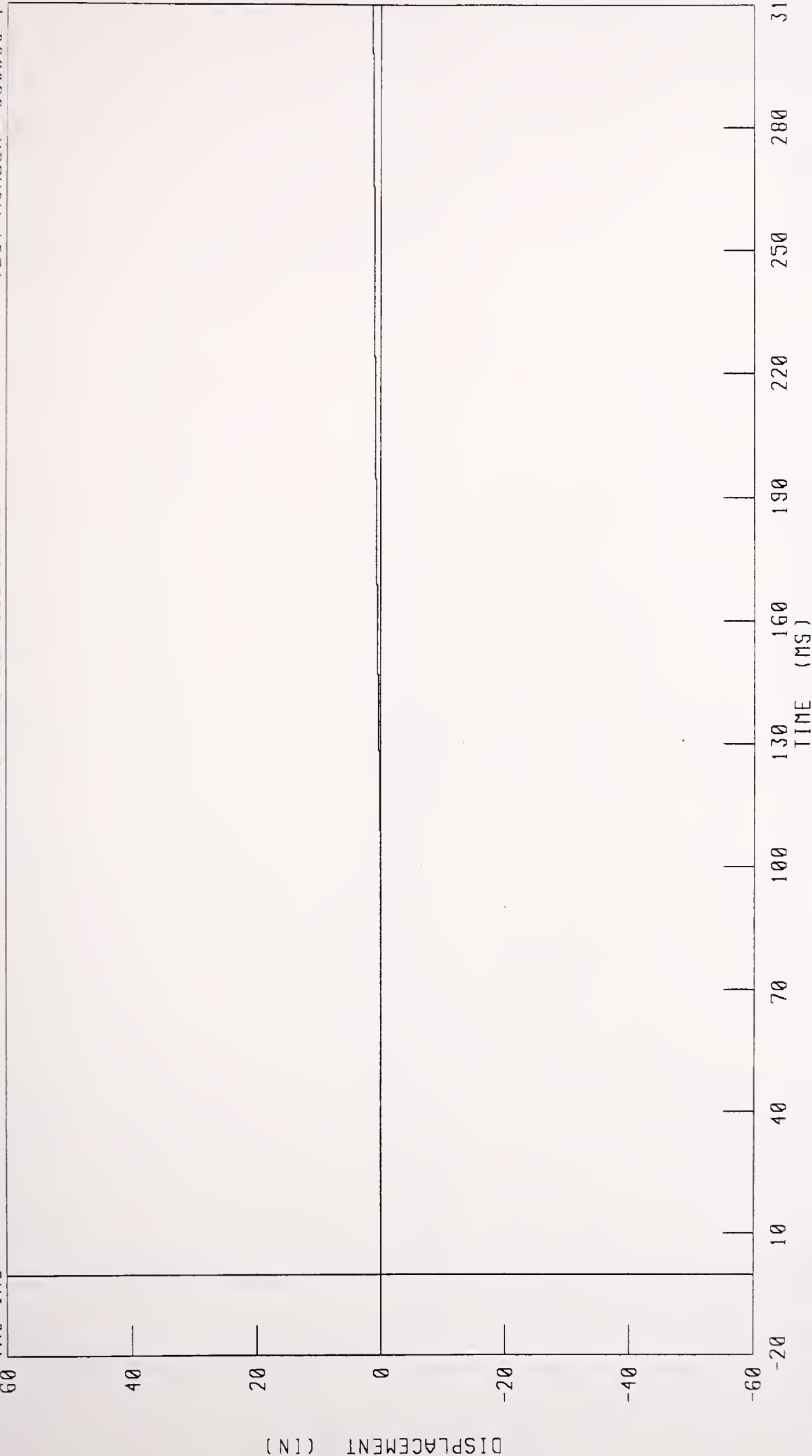
TAURUS INTO UNDERRIDE GUARD TEST NUMBER 930603-1



CHANNEL LRSYV1 FILTER CH CLASS 180

1990 FORD TAURUS INTO RIGID HEAVY TRUCK REAR UNDERRIDE GUARD TEST NO 1  
 LEFT REAR SILL Y-AXIS DISPLACEMENT

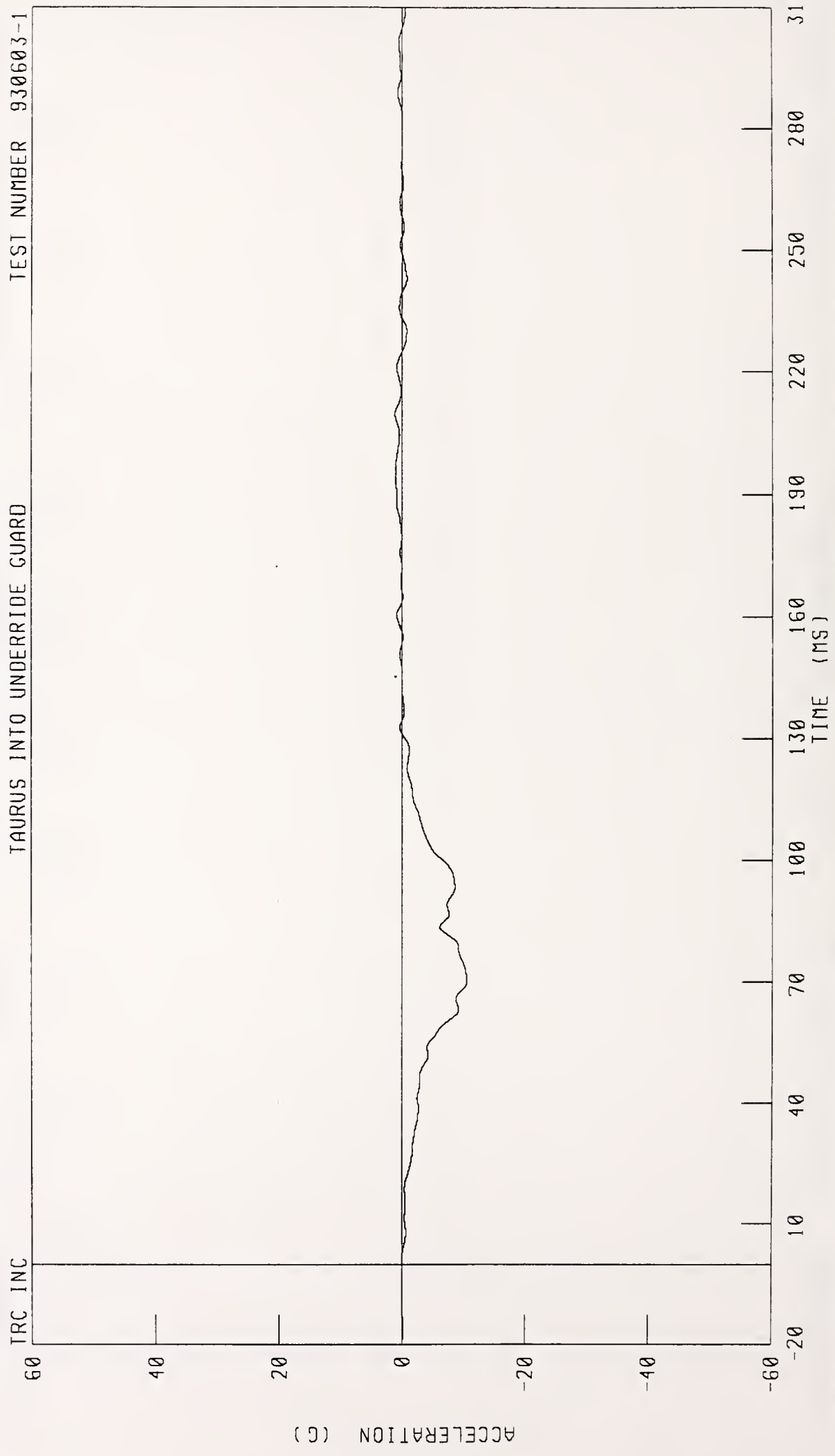
IRC INC TAURUS INTO UNDERRIDE GUARD TEST NUMBER 930603-1



CHANNEL LRSYD1 FILTER CH CLASS 180 PEAK DATA 1 35 IN @ 310 00 MS, -0 06 IN @ 74 50 MS

1990 FORD TAURUS INTO RIGID HEAVY TRUCK REAR UNDERRIDE GUARD TEST NO 1  
RIGHT REAR SILL X-AXIS ACCELERATION

TAURUS INTO UNDERRIDE GUARD TEST NUMBER 930603-1



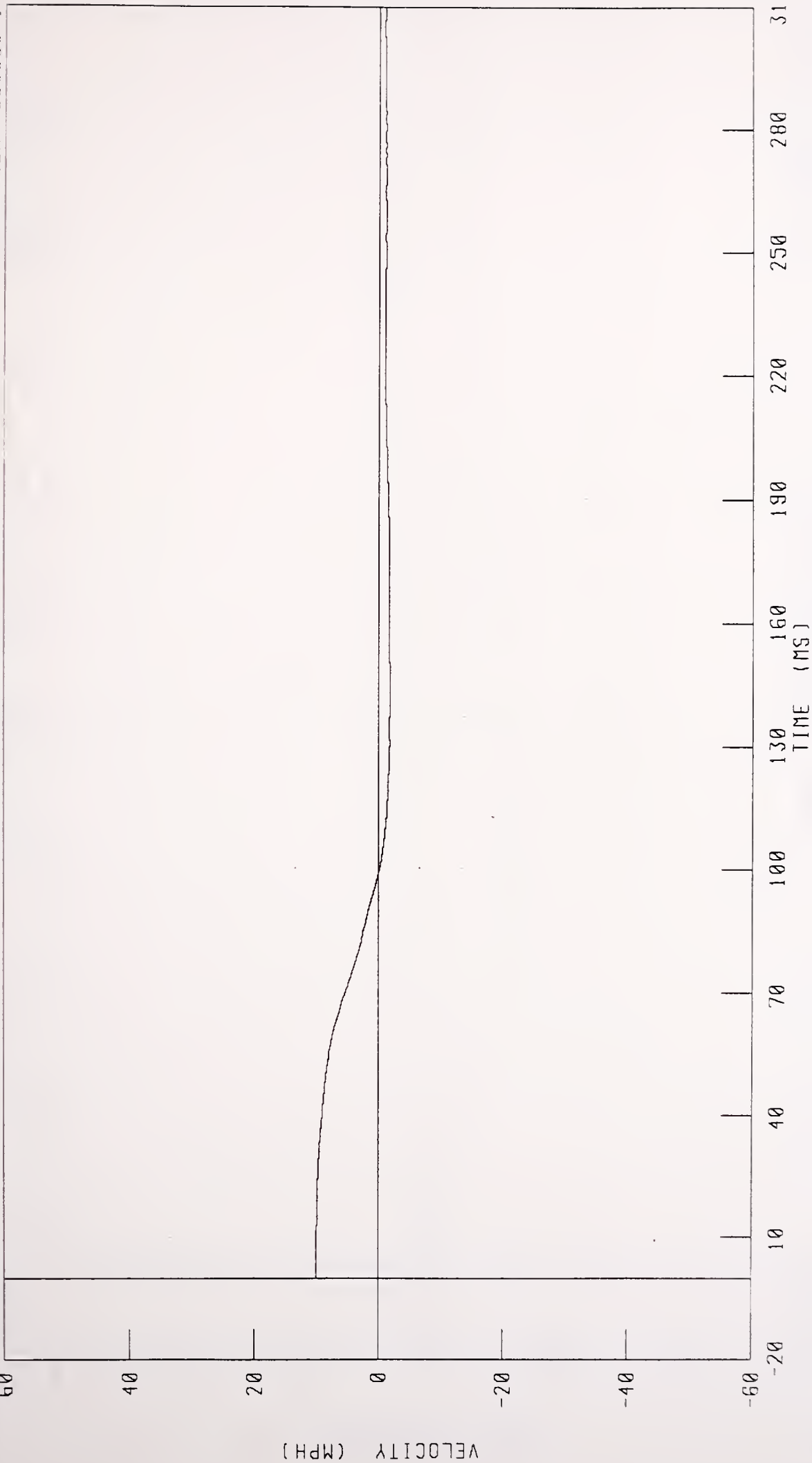
CHANNEL RRSXG1 FILTER CH CLASS 60 PEAK DATA 1 16 G @ 209 50 MS, -10 56 G @ 70 13 MS



1990 FORD TAURUS INTO RIGID HEAVY TRUCK REAR UNDERRIDE GUARD TEST NO 1  
RIGHT REAR SILL X-AXIS VELOCITY

TAURUS INTO UNDERRIDE GUARD TEST NUMBER 930603-1

TRC INC

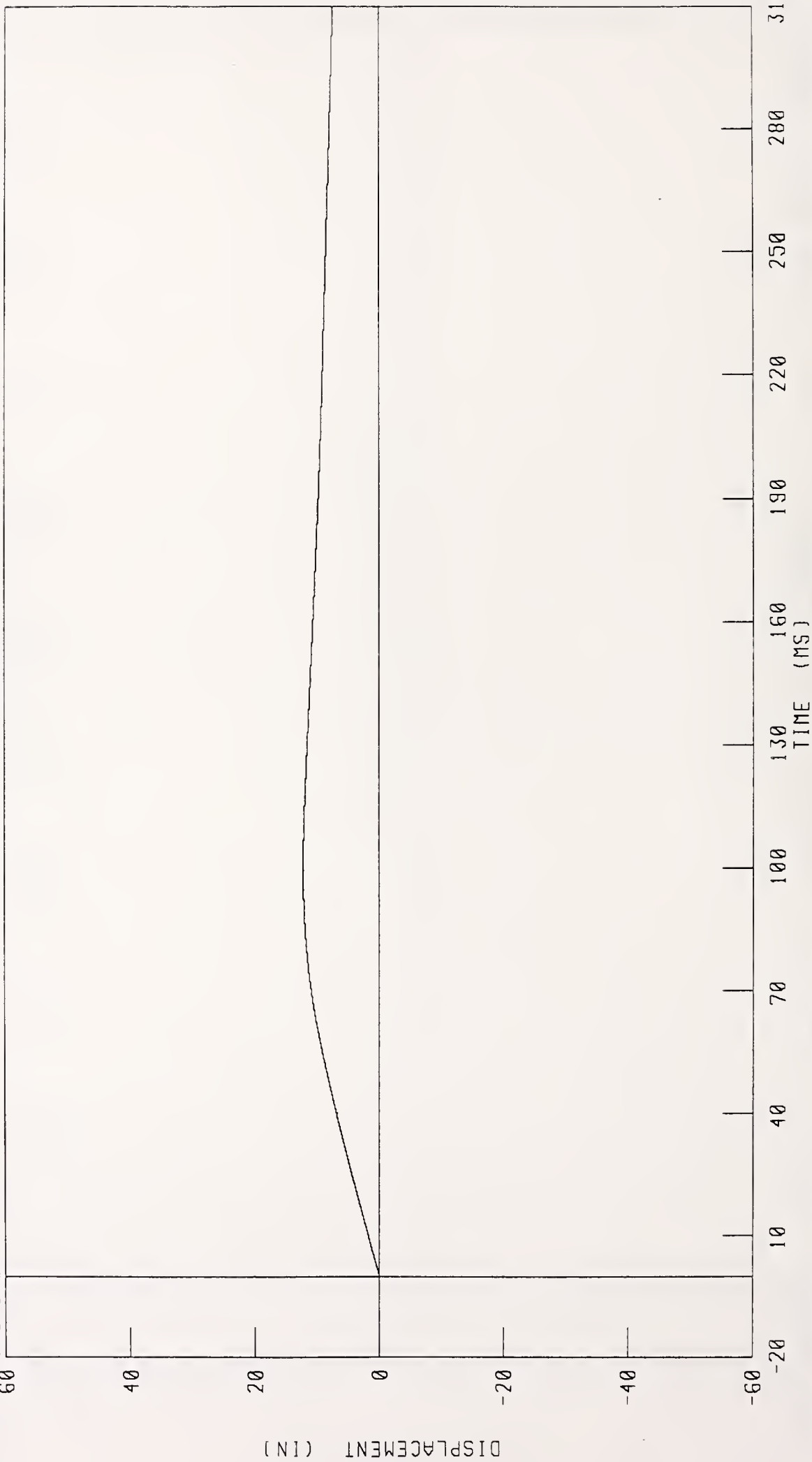


CHANNEL RRSXV1 FILTER CH CLASS 180

PEAK DATA 10 00 MPH @ 3 00 MS,  $\pm$ 1 78 MPH @ 142 38 MS

1990 FORD TAURUS INTO RIGID HEAVY TRUCK REAR UNDERRIDE GUARD TEST NO 1  
RIGHT REAR SILL X-AXIS DISPLACEMENT

TRC INC TAURUS INTO UNDERRIDE GUARD TEST NUMBER 930603-1



CHANNEL RRSXD1 FILTER CH CLASS 180

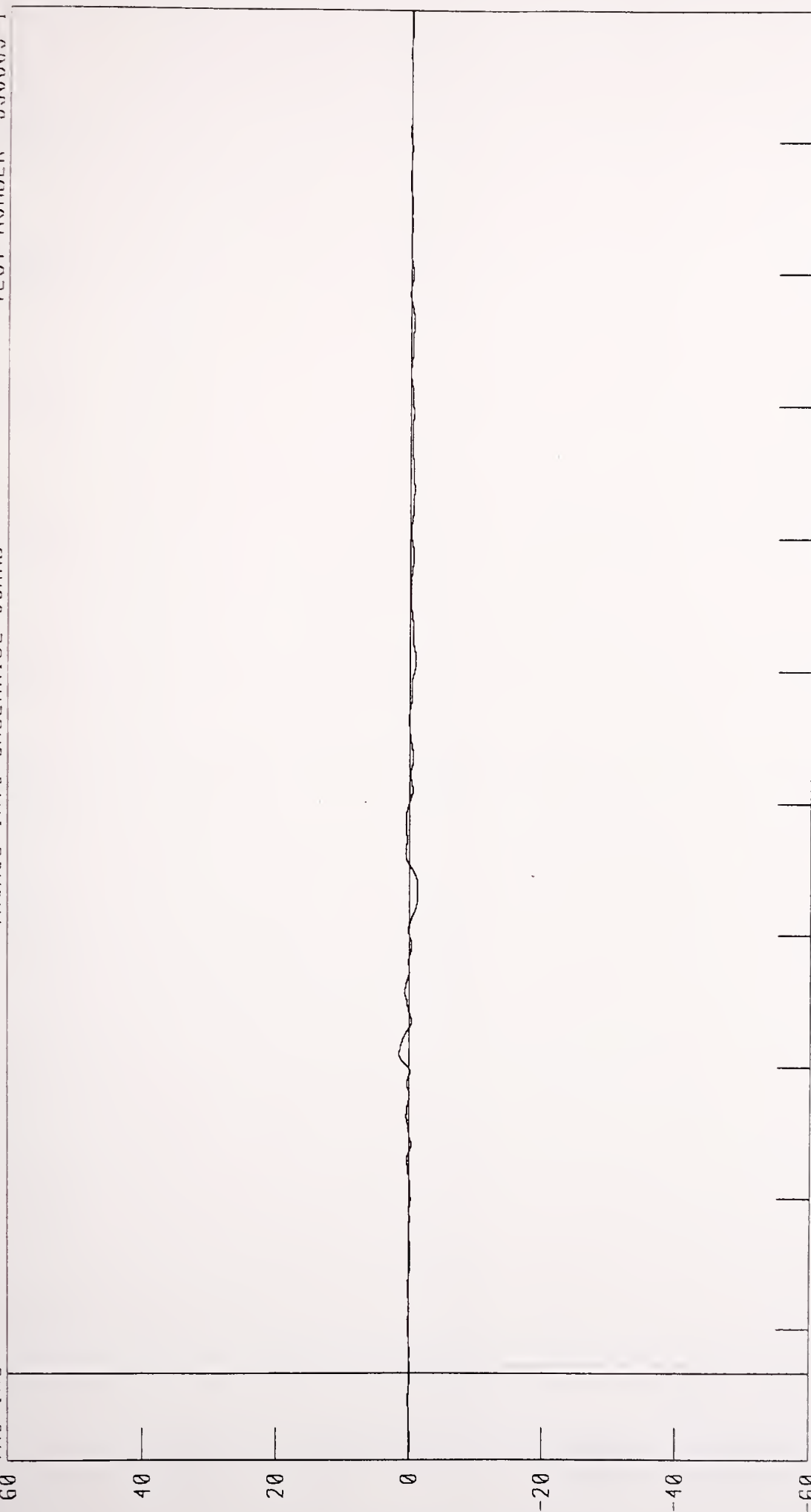
PEAK DATA 12 19 IN @ 98 88 MS, 0 00 IN @ 0 00 MS

1990 FORD TAURUS INTO RIGID HEAVY TRUCK REAR UNDERRIDE GUARD TEST NO 1  
 RIGHT REAR SILL Y-AXIS ACCELERATION

TEST NUMBER 930603 1

TAURUS INTO UNDERRIDE GUARD

TRC INC



CHANNEL RRSYG1 FILTER CH CLASS 60  
 PEAK DATA 1 49 G @ 72 75 MS, -1 18 G @ 111 50 MS

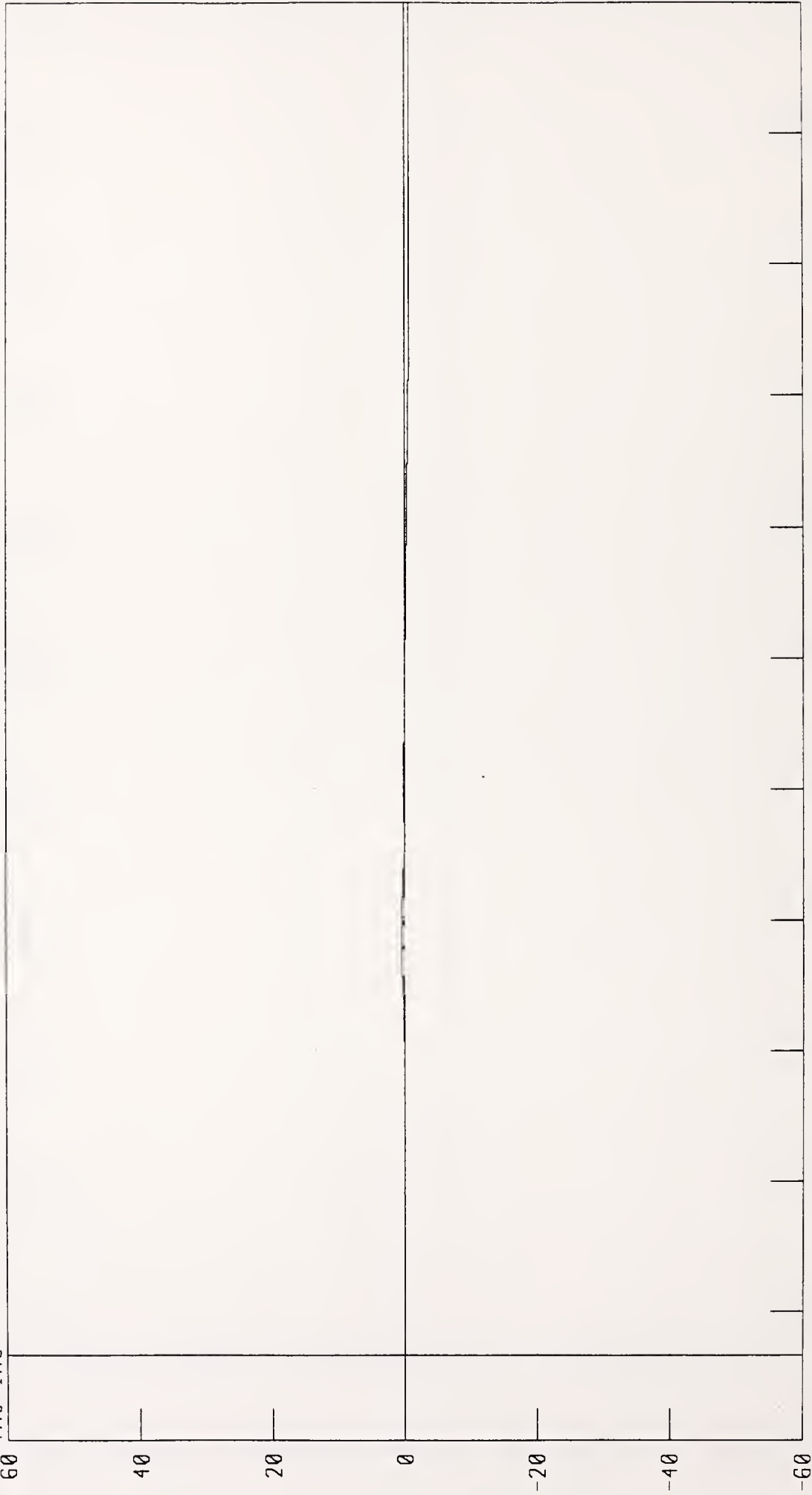


1990 FORD TAURUS INTO RIGID HEAVY TRUCK REAR UNDERRIDE GUARD TEST NO 1

RIGHT REAR SILL Y-AXIS VELOCITY

TAURUS INTO UNDERRIDE GUARD TEST NUMBER 930603-1

TRC INC



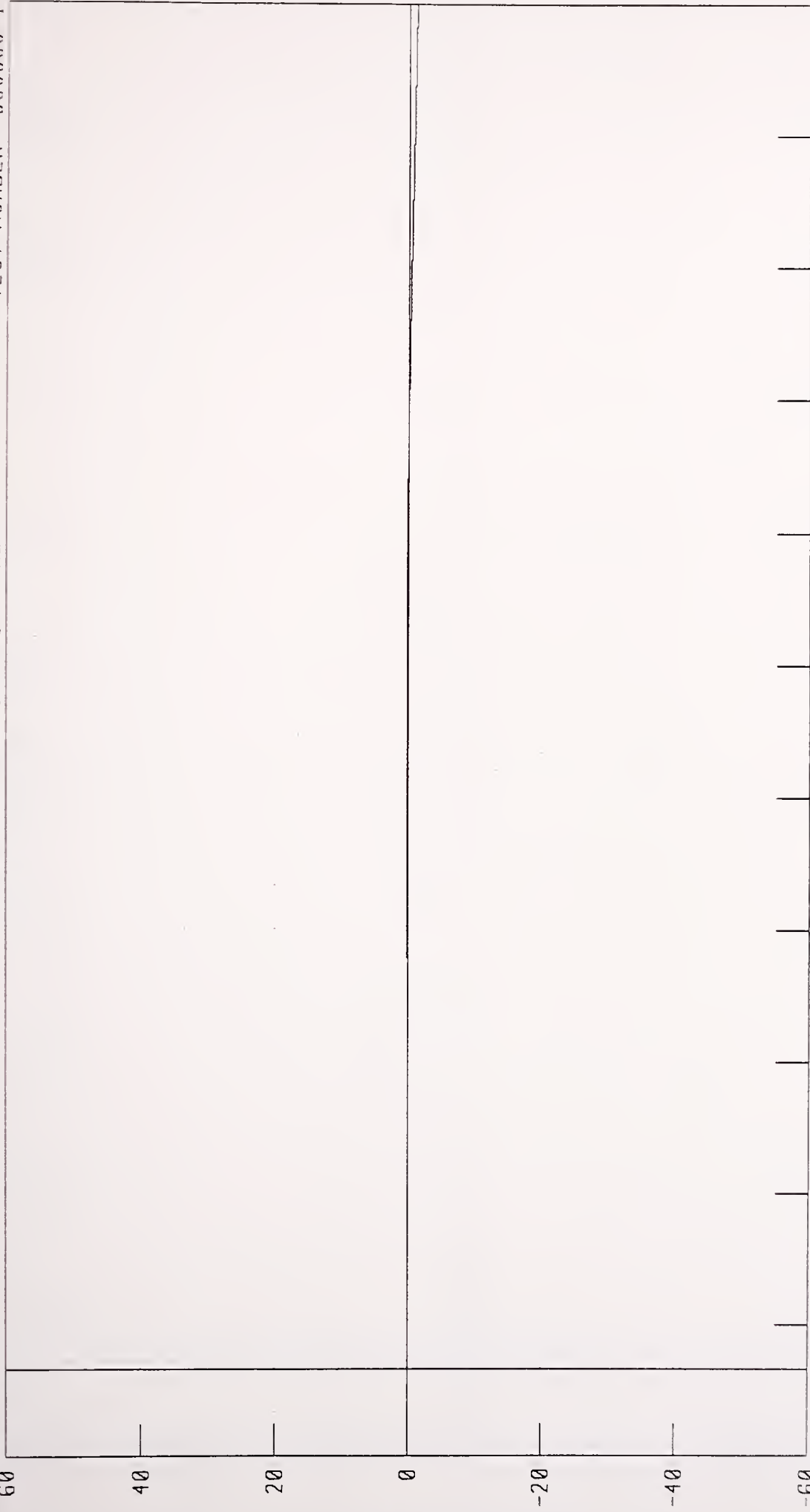
CHANNEL RRSYV1 FILTER CH CLASS 180

PEAK DATA 0 31 MPH @ 95 88 MS, -0 75 MPH @ 267 38 MS

1990 FORD TAURUS INTO RIGID HEAVY TRUCK REAR UNDERRIDE GUARD TEST NO 1  
 RIGHT REAR SILL Y-AXIS DISPLACEMENT

TAURUS INTO UNDERRIDE GUARD TEST NUMBER 930603 1

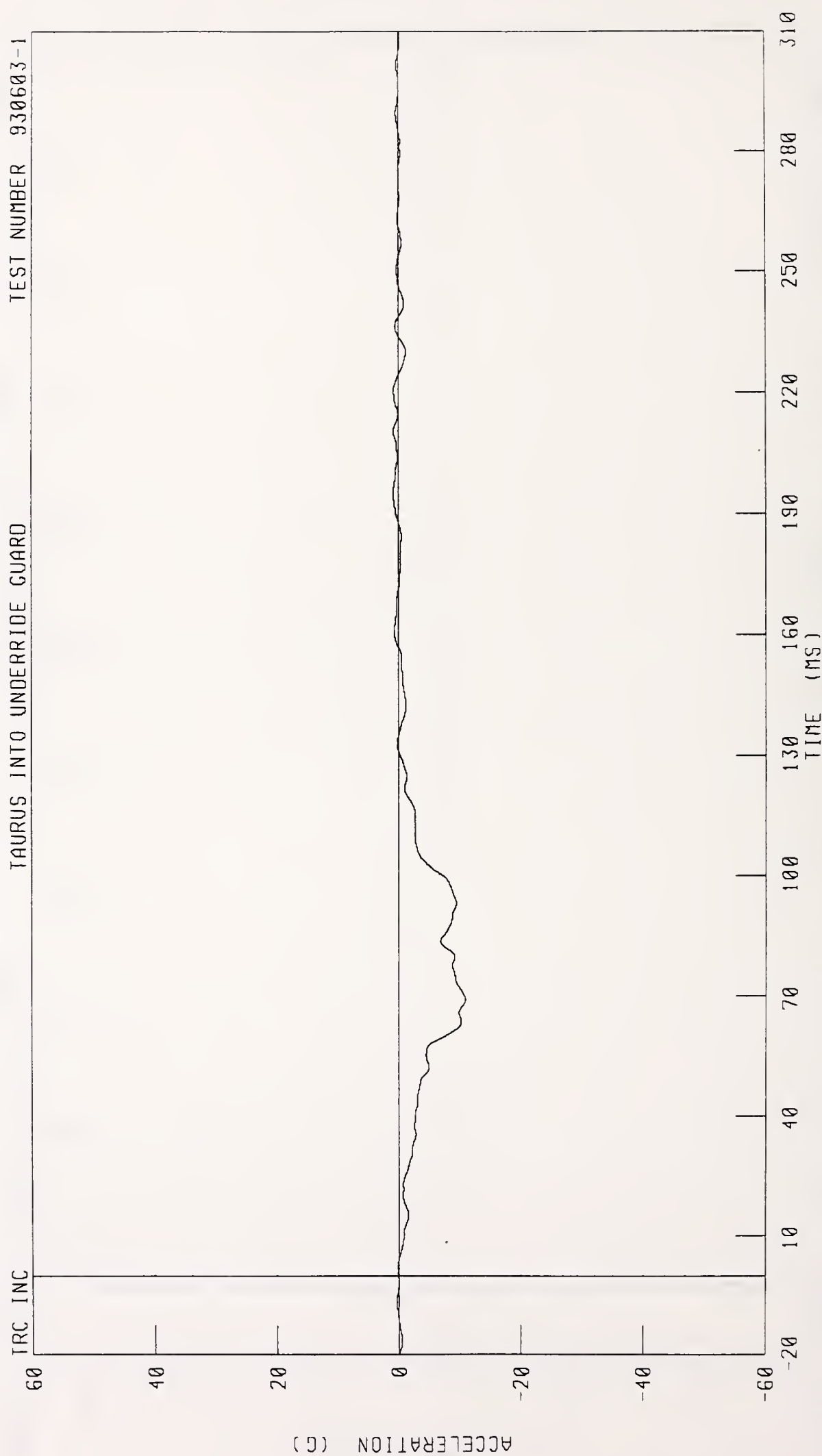
TRC INC



CHANNEL RRSYD1 FILTER CH CLASS 180  
 TIME (MS)  
 PEAK DATA 0 25 IN @ 160 25 MS, -1 16 IN @ 310 00 MS

1990 FORD TAURUS INTO RIGID HEAVY TRUCK REAR UNDERRIDE GUARD TEST NO 1  
 VEHICLE CENTER OF GRAVITY X-AXIS ACCELERATION

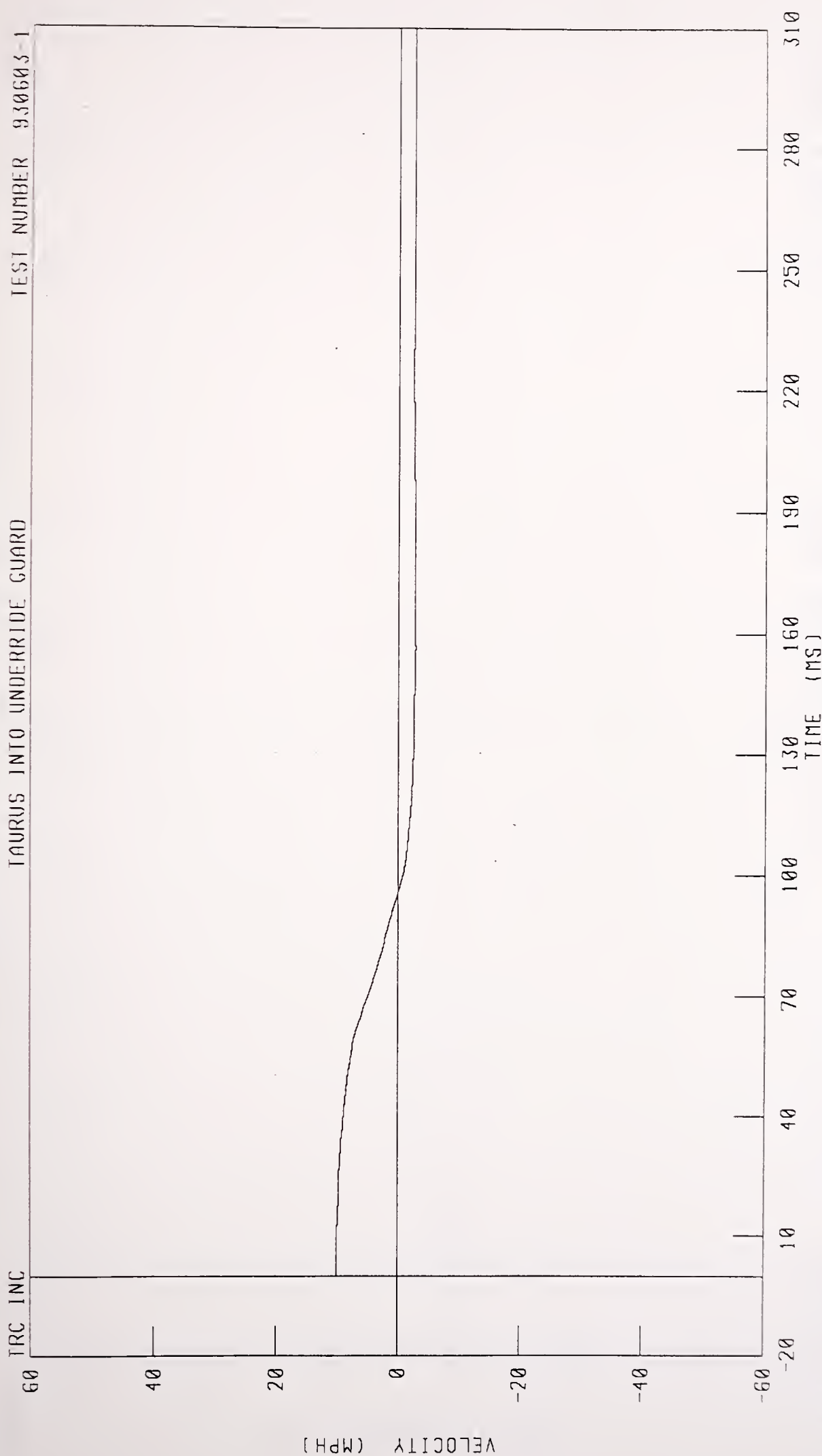
TAURUS INTO UNDERRIDE GUARD TEST NUMBER 930603-1



CHANNEL VCGXG1 FILTER CH CLASS 60 PEAK DATA 0 87 G @ 210 25 MS, -10 92 G @ 69 00 MS

1990 FORD TAURUS INTO RIGID HEAVY TRUCK REAR UNDERRIDE GUARD TEST NO 1  
VEHICLE CENTER OF GRAVITY X-AXIS VELOCITY

TRC INC  
TAURUS INTO UNDERRIDE GUARD  
TEST NUMBER 930603-1



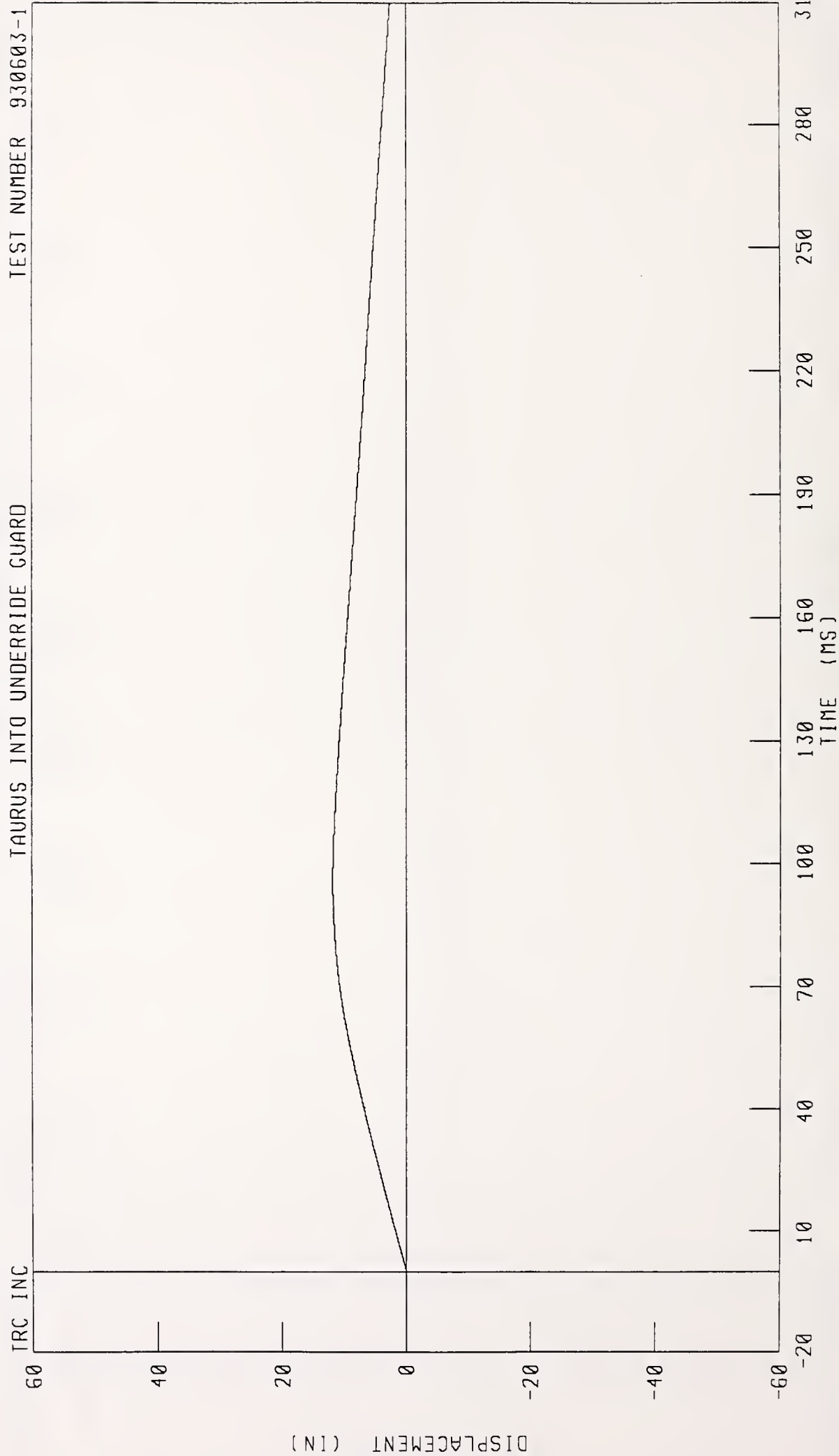
CHANNEL VCGXV1 FILTER CH CLASS 180 PEAK DATA 10 02 MPH @ 4 63 MS, -2 79 MPH @ 156 25 MS



1990 FORD TAURUS INTO RIGID HEAVY TRUCK REAR UNDERRIDE GUARD TEST NO 1

VEHICLE CENTER OF GRAVITY X-AXIS DISPLACEMENT

TAURUS INTO UNDERRIDE GUARD TEST NUMBER 930603-1



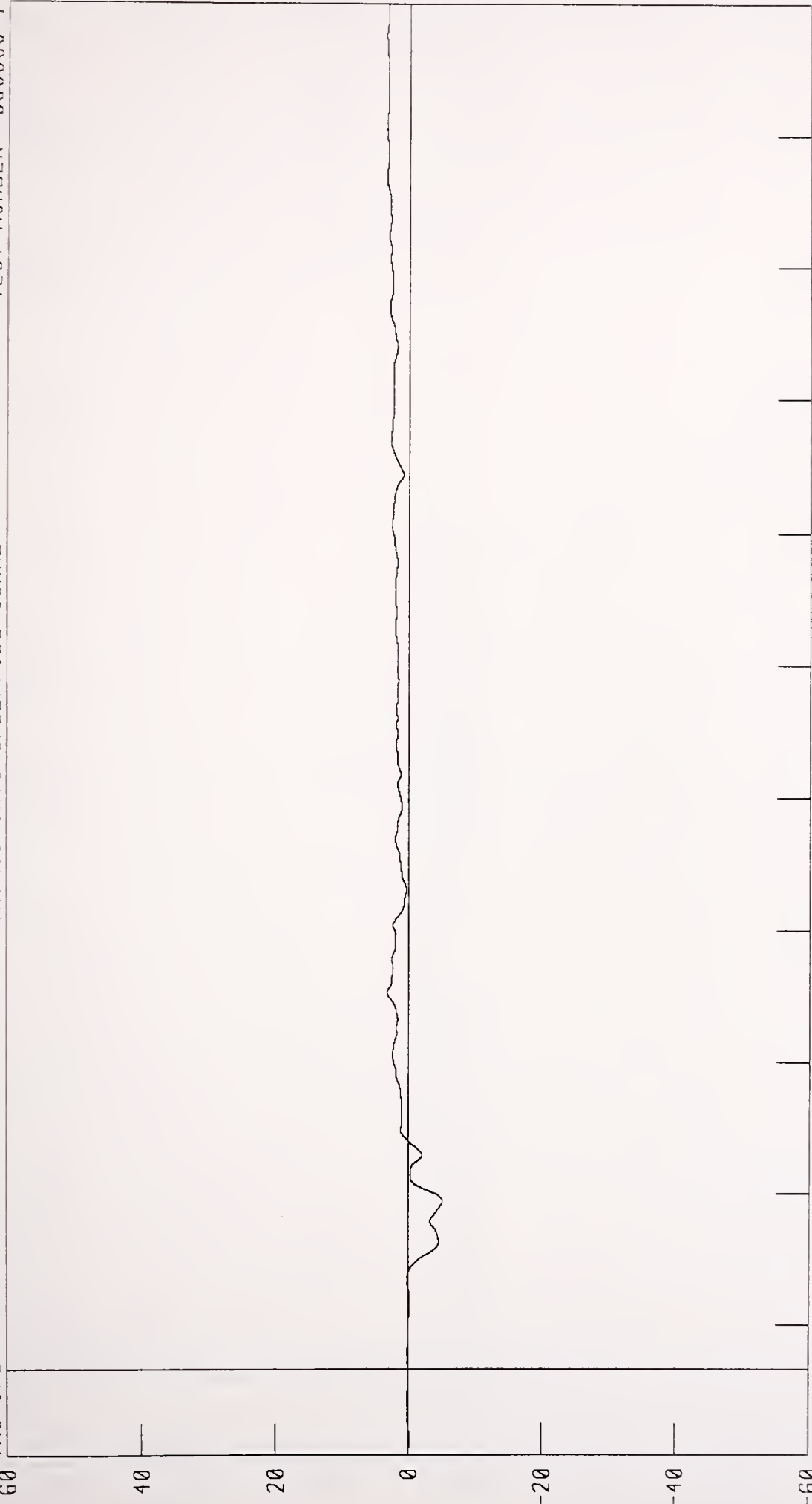
CHANNEL VCGXD1 FILTER CH CLASS 180

PEAK DATA 11 80 IN @ 95 38 MS, 0 00 IN @ 0 00 MS

1990 FORD TAURUS INTO RIGID HEAVY TRUCK REAR UNDERRIDE GUARD TEST NO 1  
 VEHICLE CENTER OF GRAVITY Y-AXIS ACCELERATION

TAURUS INTO UNDERRIDE GUARD TEST NUMBER 930603 1

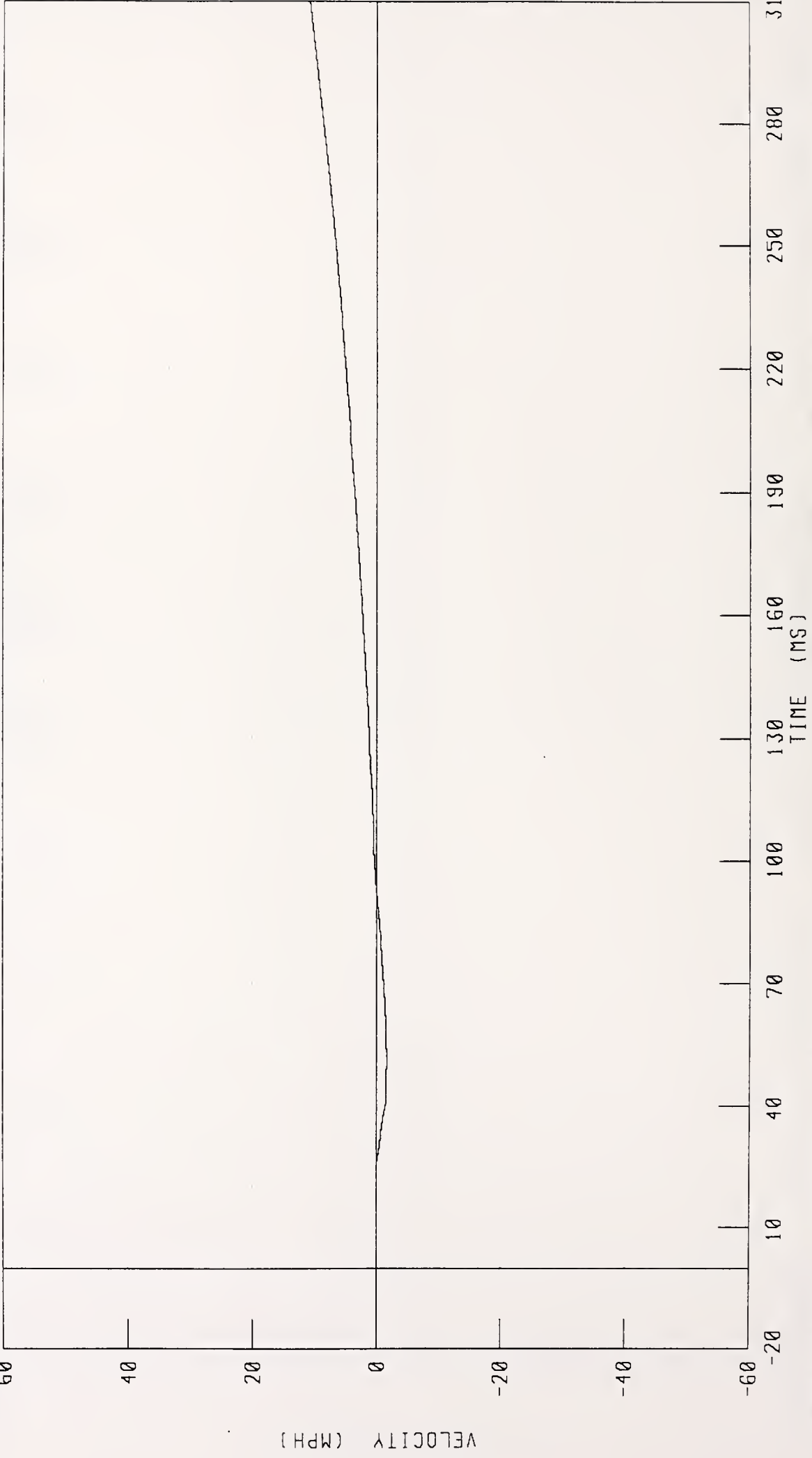
IRC INC



CHANNEL VCCYG1 FILTER CH CLASS 60  
 TIME (MS)  
 PEAK DATA 3 50 G @ 302 75 MS, -5 11 G @ 38 13 MS

1990 FORD TAURUS INTO RIGID HEAVY TRUCK REAR UNDERRIDE GUARD TEST NO 1  
 VEHICLE CENTER OF GRAVITY Y-AXIS VELOCITY

TRC INC TAURUS INTO UNDERRIDE GUARD TEST NUMBER 930603--1



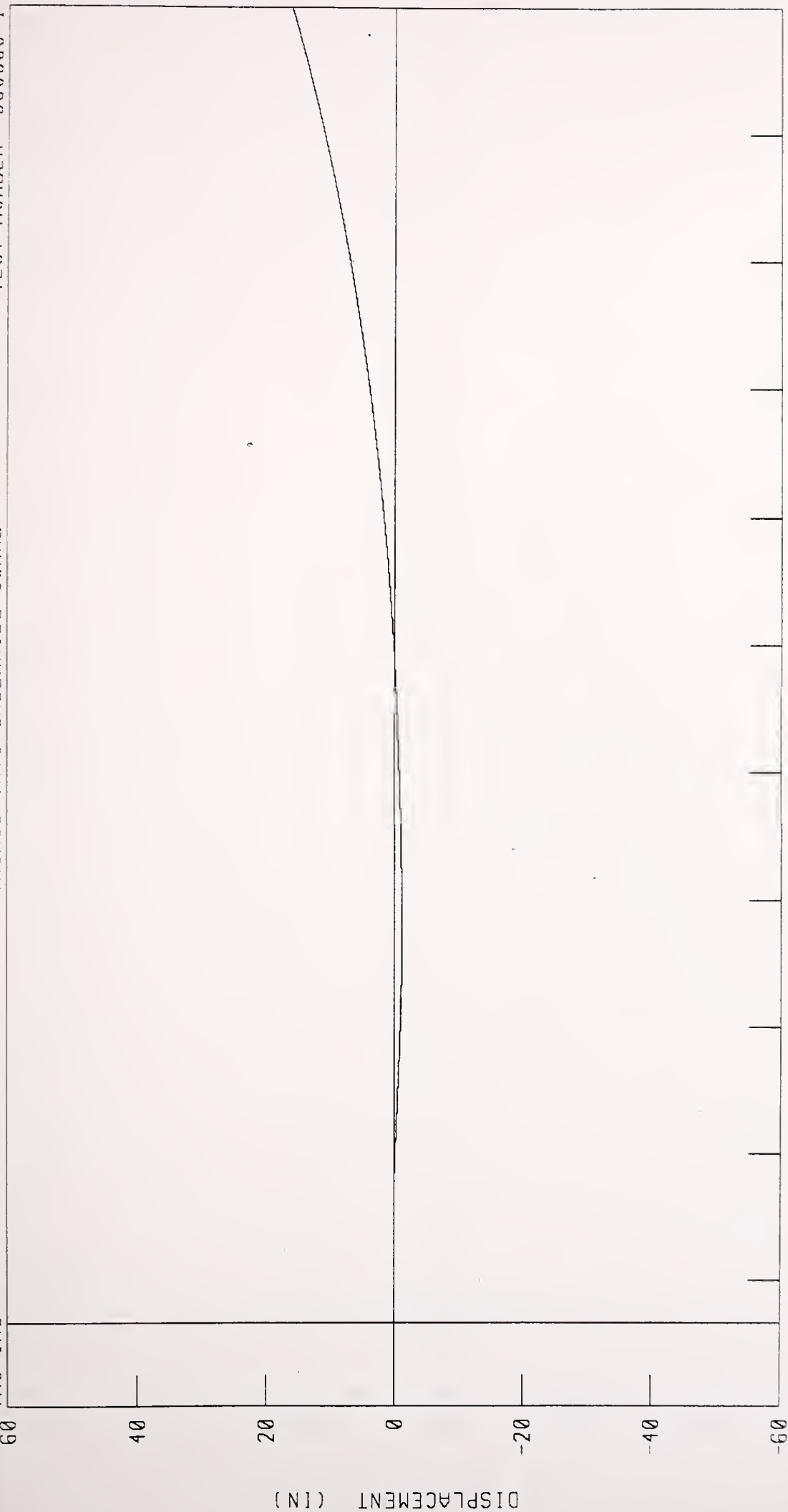
CHANNEL VCGYV1 FILTER CH CLASS 180

PEAK DATA 10 79 MPH @ 310 00 MS, -1 65 MPH @ 50 13 MS

1990 FORD TAURUS INTO RIGID HEAVY TRUCK REAR UNDERRIDE GUARD TEST NO 1  
 VEHICLE CENTER OF GRAVITY Y-AXIS DISPLACEMENT

TAURUS INTO UNDERRIDE GUARD TEST NUMBER 930603-1

TRC INC



TIME (MS)

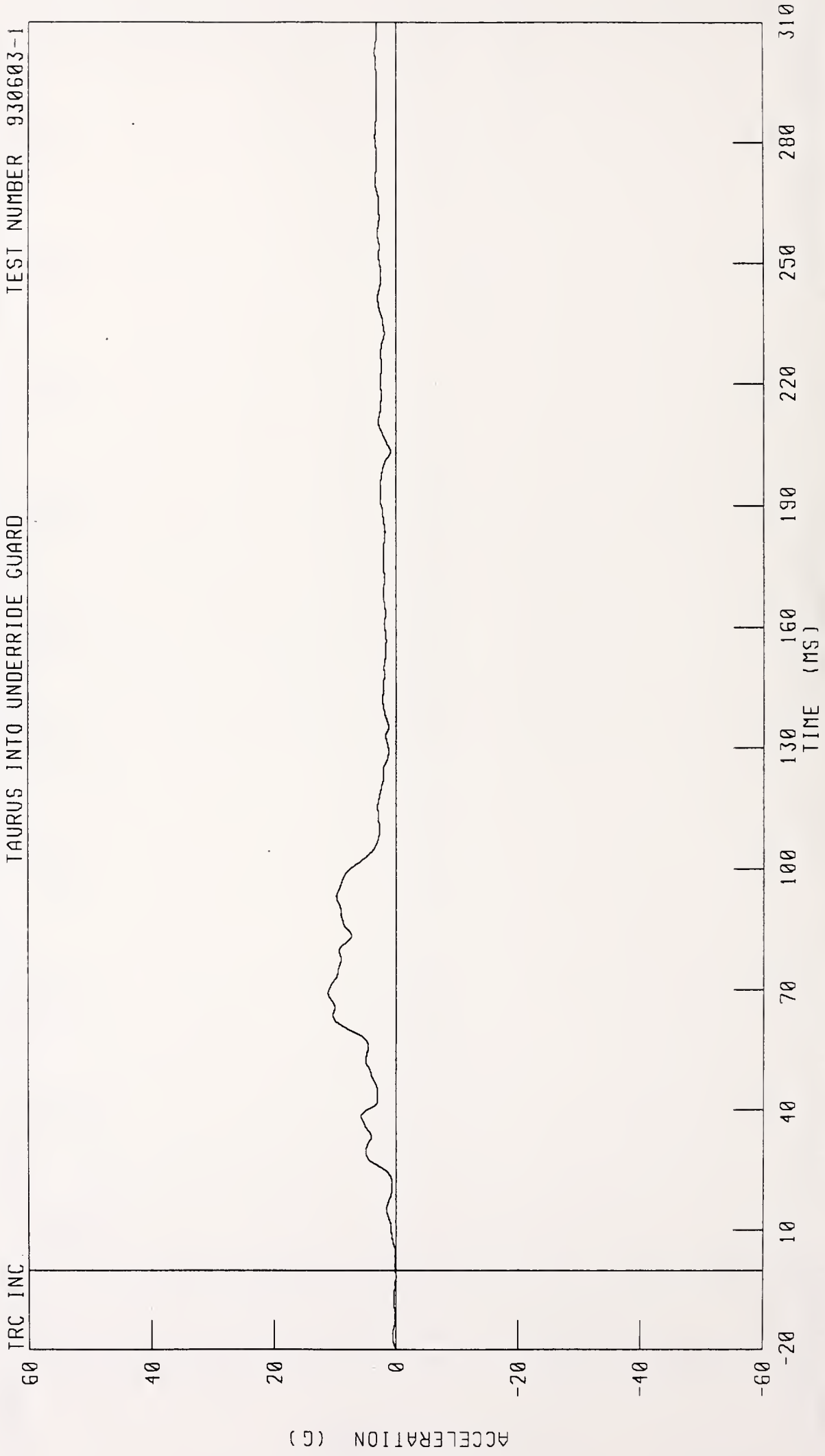
PEAK DATA 16 14 IN @ 310 00 MS, -1 18 IN @ 93 00 MS

CHANNEL VCCY01 FILTER CH CLASS 180



1990 FORD TAURUS INTO RIGID HEAVY TRUCK REAR UNDERRIDE GUARD TEST NO 1  
 VEHICLE CENTER OF GRAVITY RESULTANT ACCELERATION

TRC INC. TAURUS INTO UNDERRIDE GUARD TEST NUMBER 930603-1



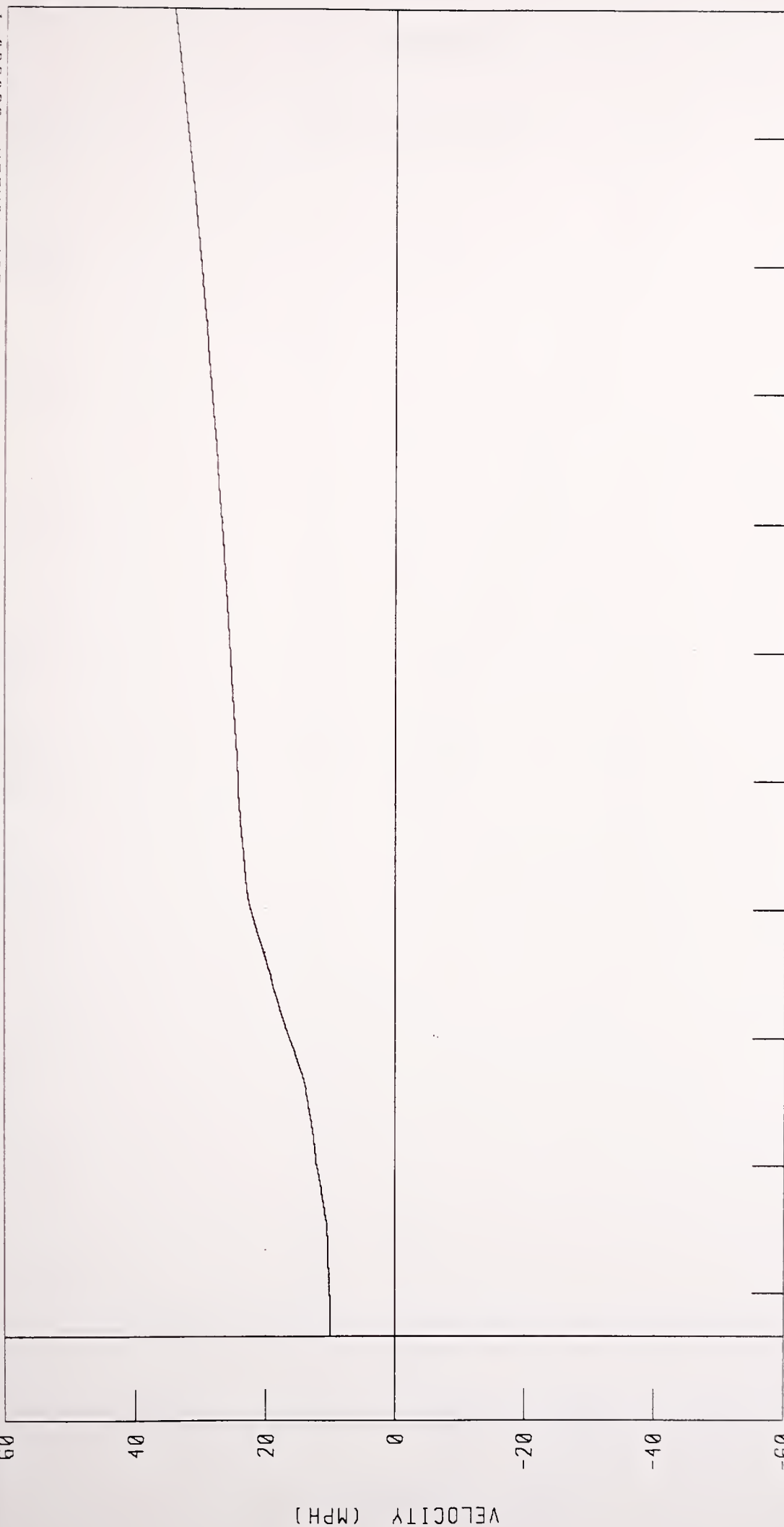
CHANNEL VCGRG1 FILTER CH CLASS 60 PEAK DATA 11 12 G @ 69 13 MS, 0 01 G @ -20 00 MS

1990 FORD TAURUS INTO RIGID HEAVY TRUCK REAR UNDERRIDE GUARD TEST NO 1  
 VEHICLE CENTER OF GRAVITY RESULTANT VELOCITY

TEST NUMBER 930603-1

TAURUS INTO UNDERRIDE GUARD

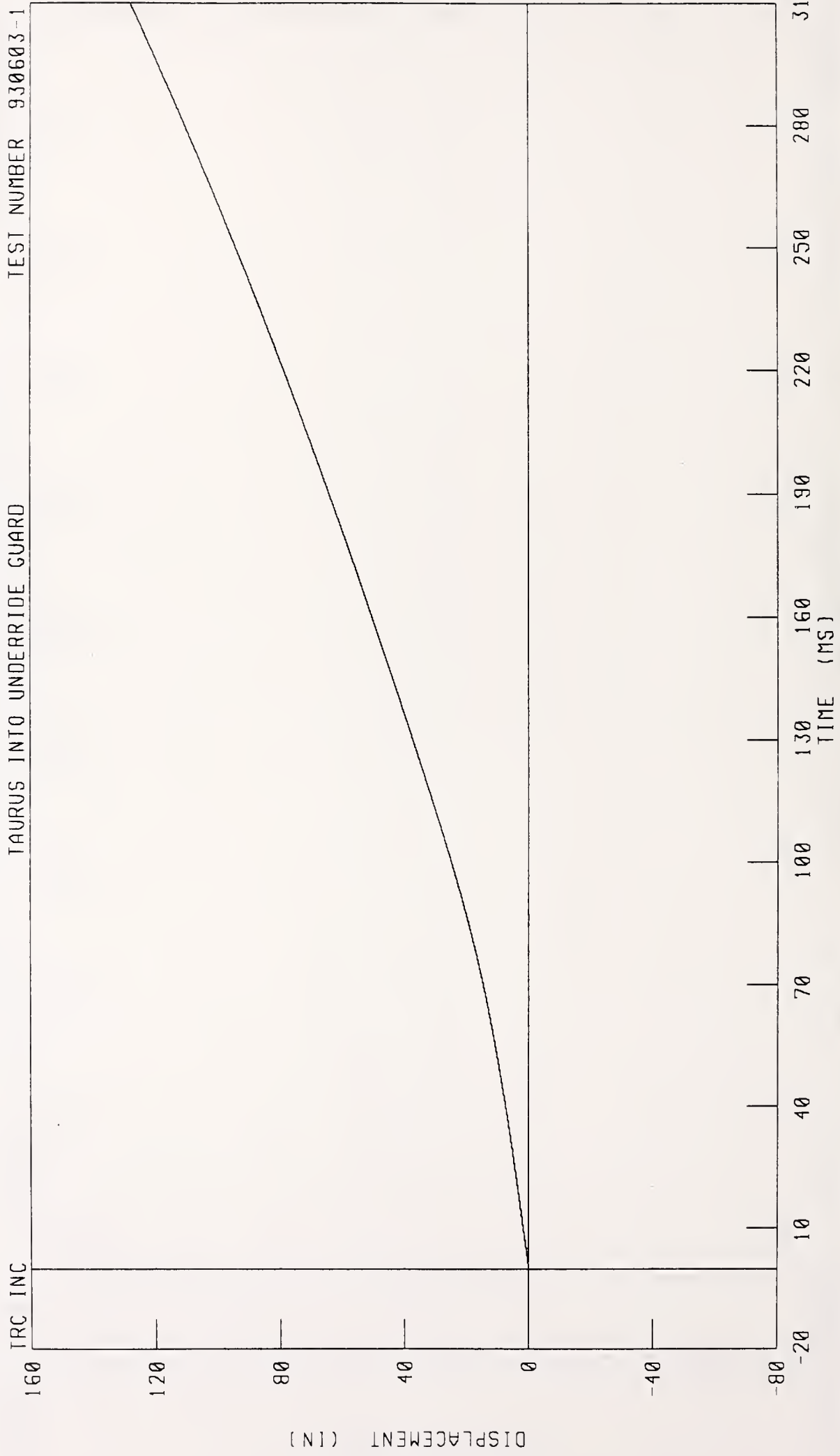
TRC INC



CHANNEL VCGRV1 FILTER CH CLASS 180  
 PEAK DATA 34 22 MPH @ 310 00 MS, 10 00 MPH @ 0 00 MS

1990 FORD TAURUS INTO RIGID HEAVY TRUCK REAR UNDERRIDE GUARD TEST NO 1  
 VEHICLE CENTER OF GRAVITY RESULTANT DISPLACEMENT

TAURUS INTO UNDERRIDE GUARD TEST NUMBER 930603-1



CHANNEL VCGRD1 FILTER CH CLASS 180 PEAK DATA 127 96 IN @ 310 00 MS, 0 00 IN @ 0 00 MS

DATA PLOTS

TEST NO. 930603-2



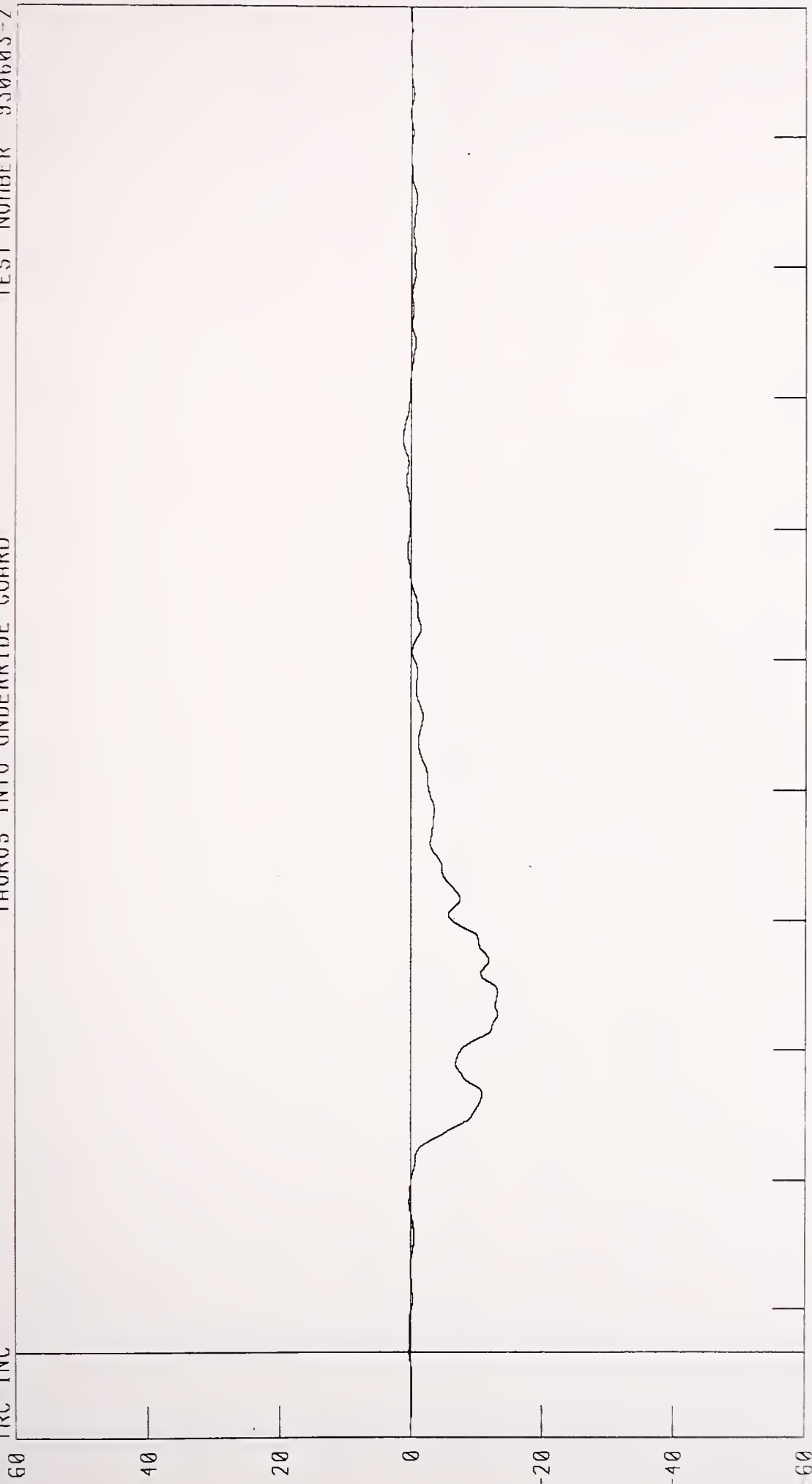


1990 FORD TAURUS INTO RIGID HEAVY TRUCK REAR UNDERRIDE GUARD TEST NO 2  
 LEFT REAR SILL X-AXIS ACCELERATION

TAURUS INTO UNDERRIDE GUARD

TEST NUMBER 930603-2

TRC INC

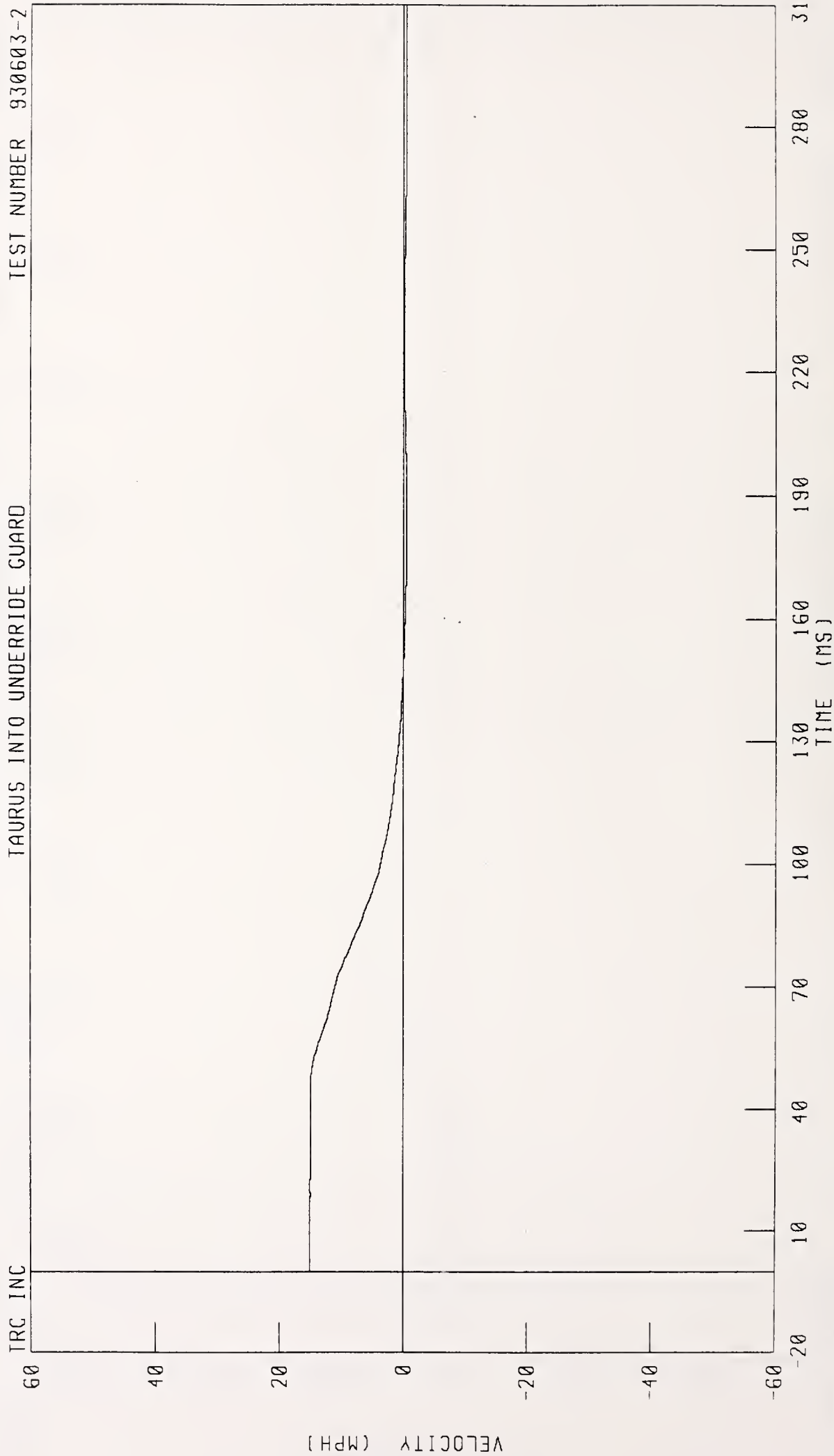


CHANNEL LRSXG1 FILTER CH CLASS 60  
 PEAK DATA 1 21 G @ 210 25 MS, -13 24 G @ 78 13 MS

1990 FORD TAURUS INTO RIGID HEAVY TRUCK REAR UNDERRIDE GUARD TEST NO 2

LEFT REAR SILL X-AXIS VELOCITY

TAURUS INTO UNDERRIDE GUARD TEST NUMBER 930603-2

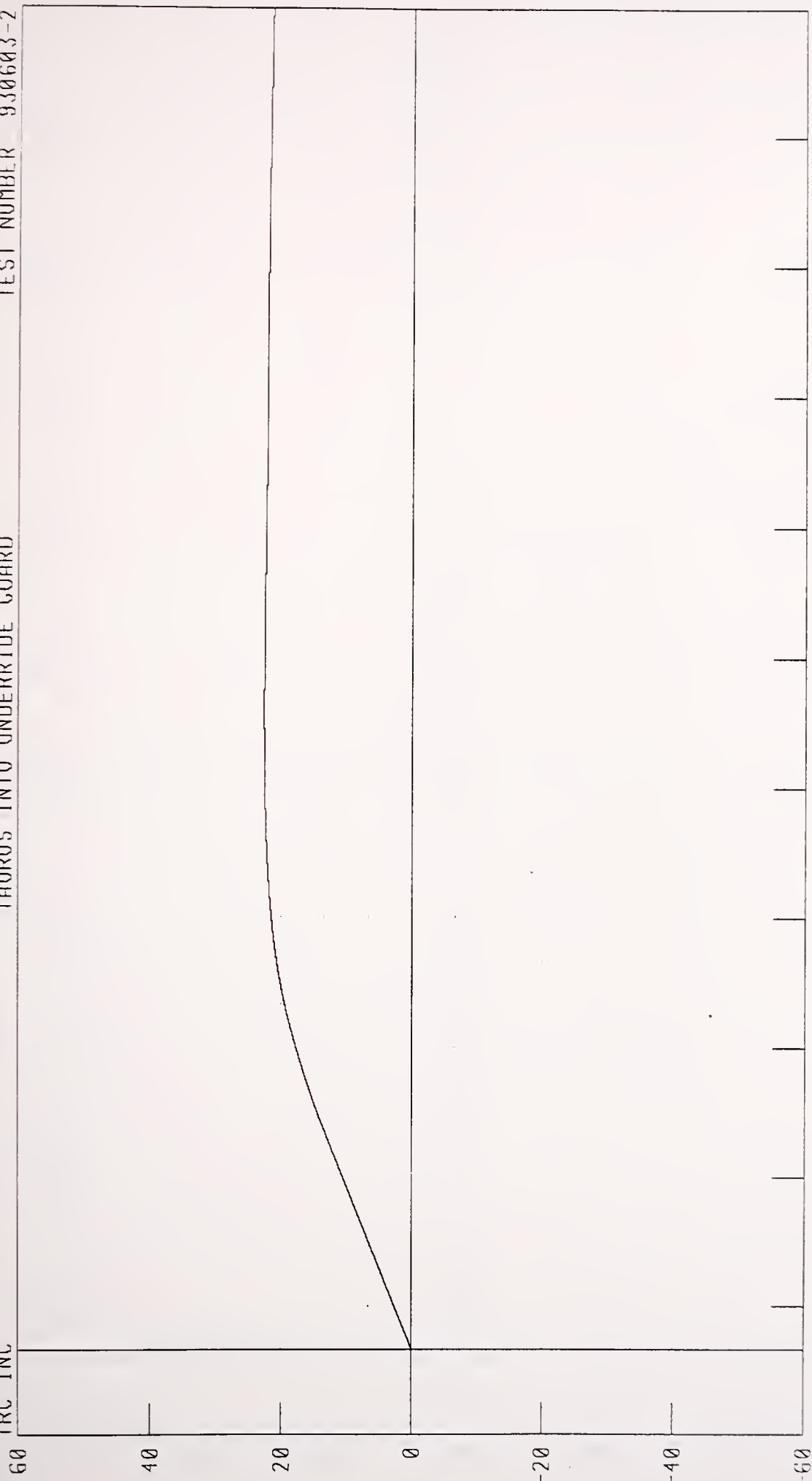


CHANNEL LRSXV1 FILTER CH CLASS 180

1990 FORD TAURUS INTO RIGID HEAVY TRUCK REAR UNDERRIDE GUARD TEST NO 2  
LEFT REAR SILL X-AXIS DISPLACEMENT

TAURUS INTO UNDERRIDE GUARD TEST NUMBER 930603-2

TRC INC



PEAK DATA

22 62 IN @ 147 63 MS, 0 00 IN @ 0 00 MS

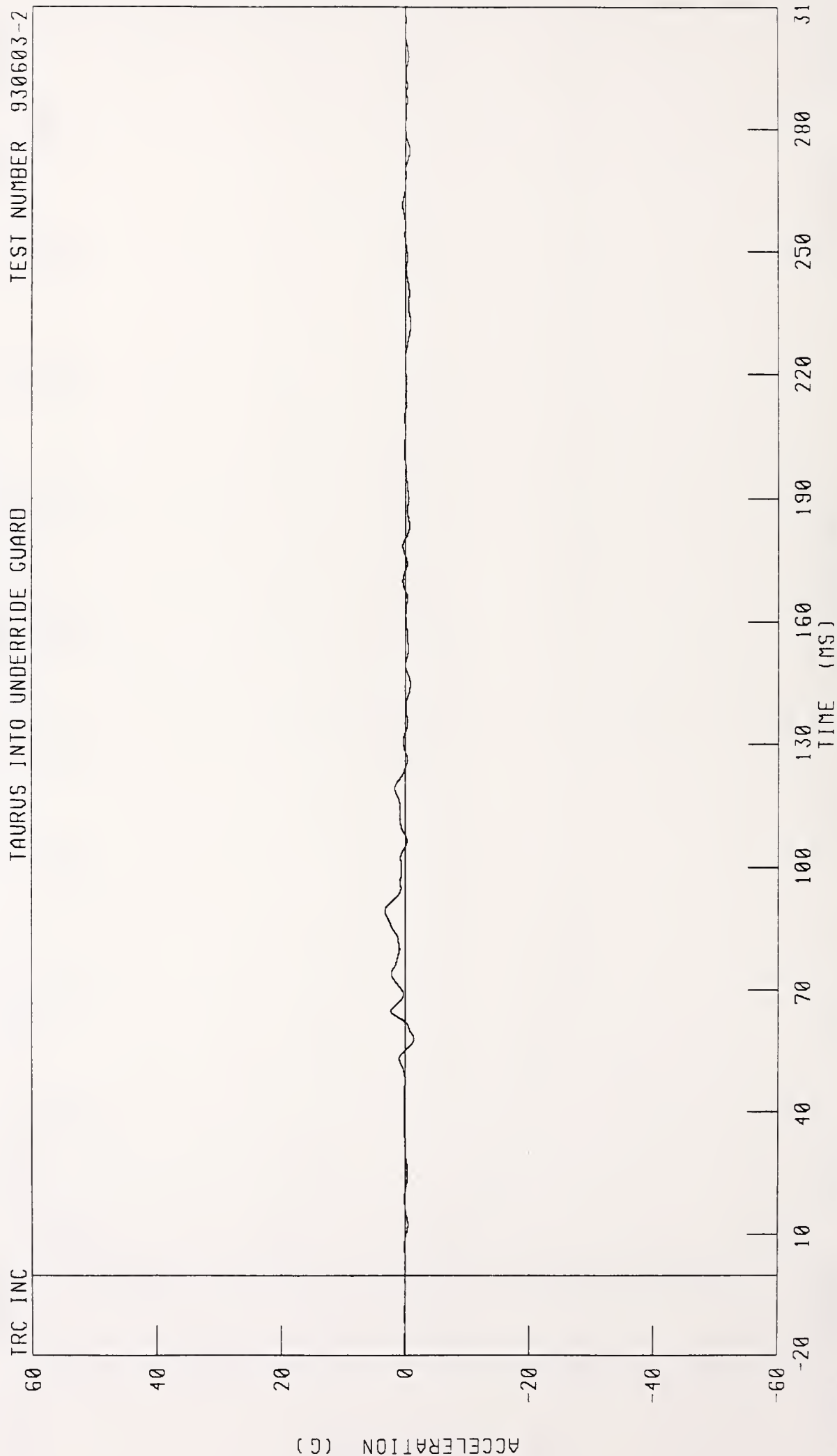
CHANNEL LRSX01 FILTER CH CLASS 180



1990 FORD TAURUS INTO RIGID HEAVY TRUCK REAR UNDERRIDE GUARD TEST NO 2

LEFT REAR SILL Y-AXIS ACCELERATION

TAURUS INTO UNDERRIDE GUARD TEST NUMBER 930603-2



CHANNEL LRSYG1 FILTER CH CLASS 60

PEAK DATA 3 31 G @ 89 25 MS, -1 40 G @ 58 00 MS

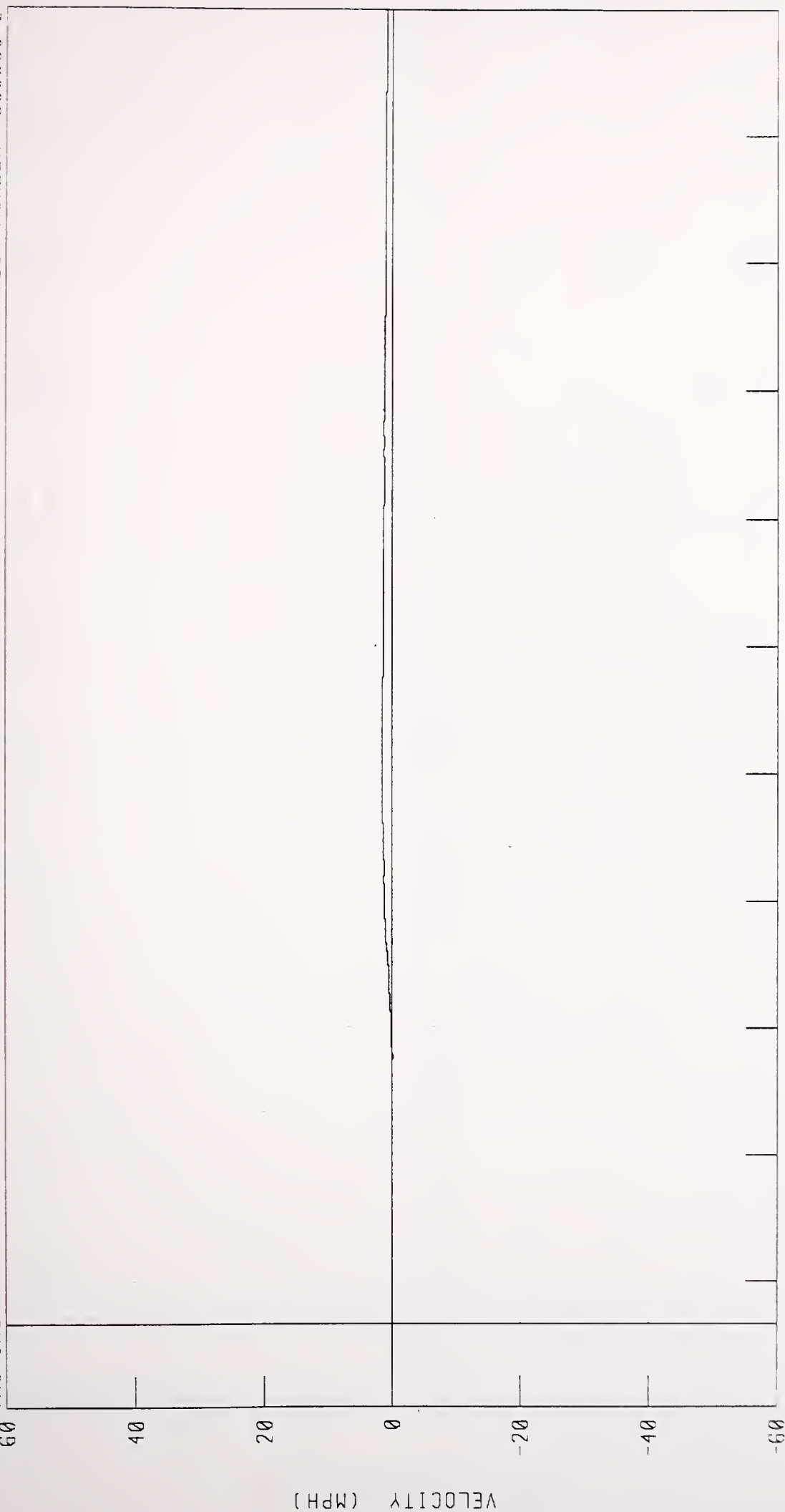
# 1990 FORD TAURUS INTO RIGID HEAVY TRUCK REAR UNDERRIDE GUARD TEST NO 2

LEFT REAR SILL Y-AXIS VELOCITY

TAURUS INTO UNDERRIDE GUARD

TEST NUMBER 930603-2

IRC INC



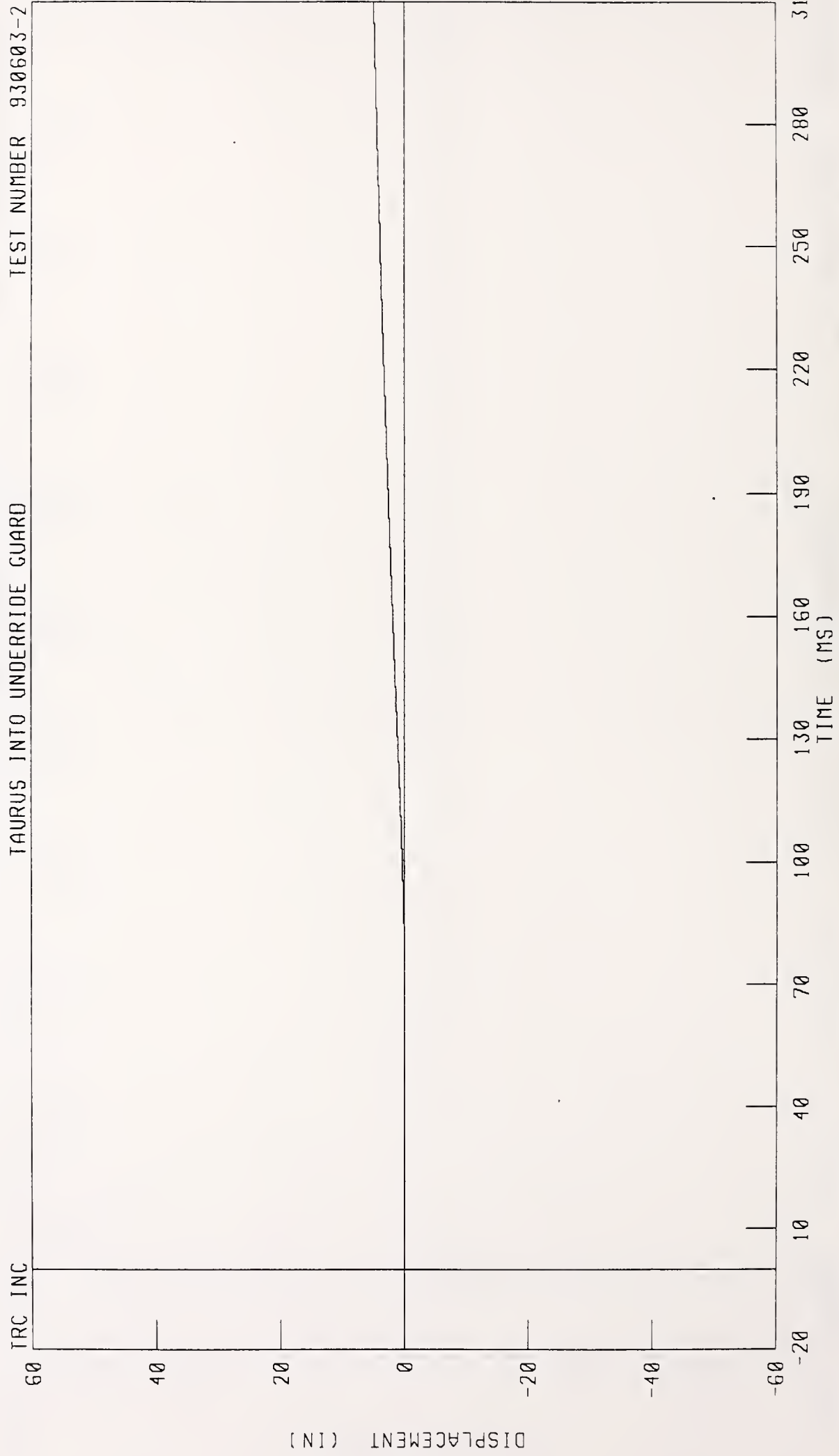
TIME (MS)

PEAK DATA 1 60 MPH @ 132 25 MS, -0 09 MPH @ 63 25 MS

CHANNEL 1 RSYV1 FILTER CH CLASS 180

1990 FORD TAURUS INTO RIGID HEAVY TRUCK REAR UNDERRIDE GUARD TEST NO 2  
 LEFT REAR SILL Y-AXIS DISPLACEMENT

TAURUS INTO UNDERRIDE GUARD TEST NUMBER 930603-2



CHANNEL LRSYD1 FILTER CH CLASS 180 PEAK DATA 4 92 IN @ 310 00 MS, -0 02 IN @ 49 50 MS

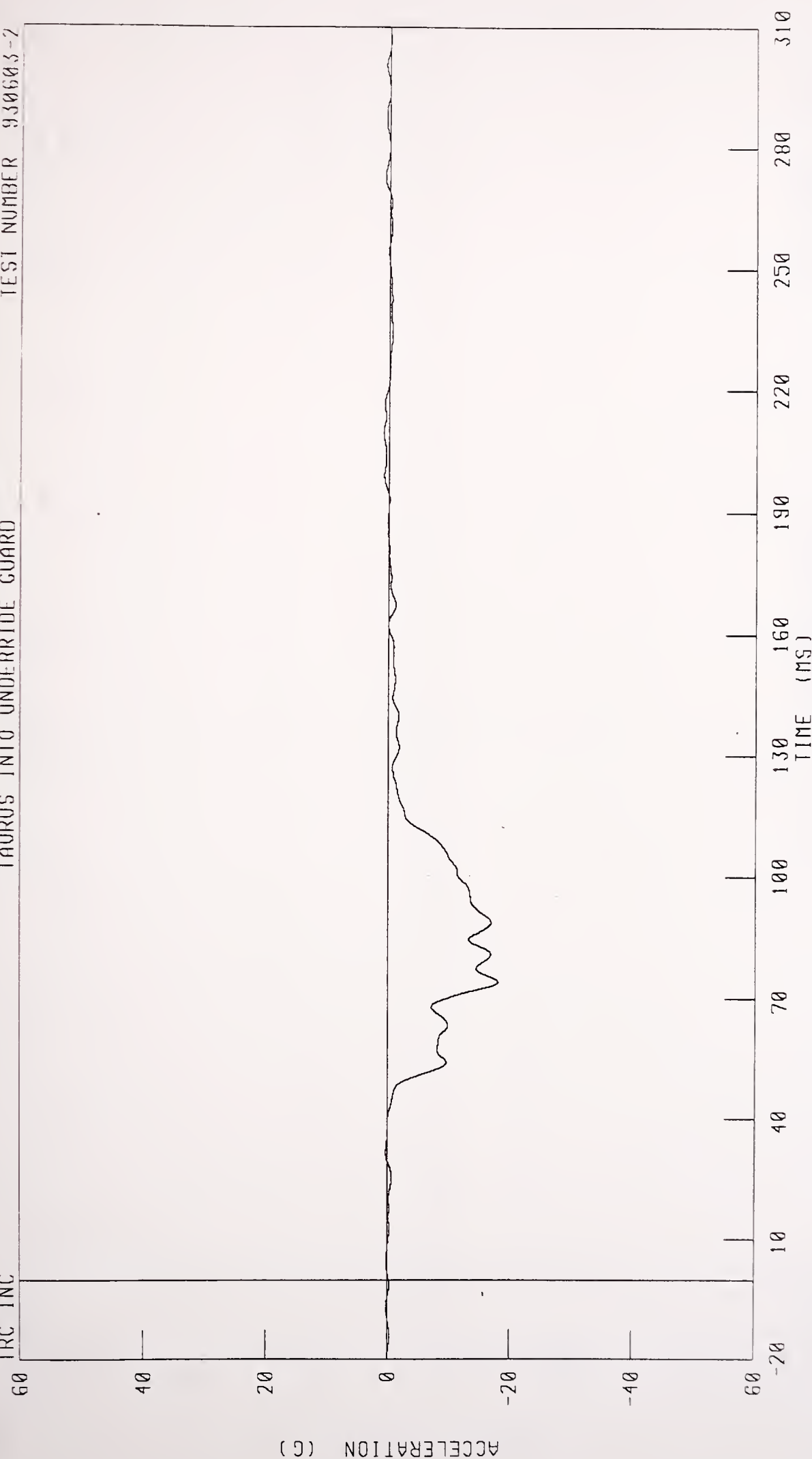
1990 FORD TAURUS INTO RIGID HEAVY TRUCK REAR UNDERRIDE GUARD TEST NO 2

RIGHT REAR SILL X-AXIS ACCELERATION

TAURUS INTO UNDERRIDE GUARD

TEST NUMBER 930603-2

TRC INC



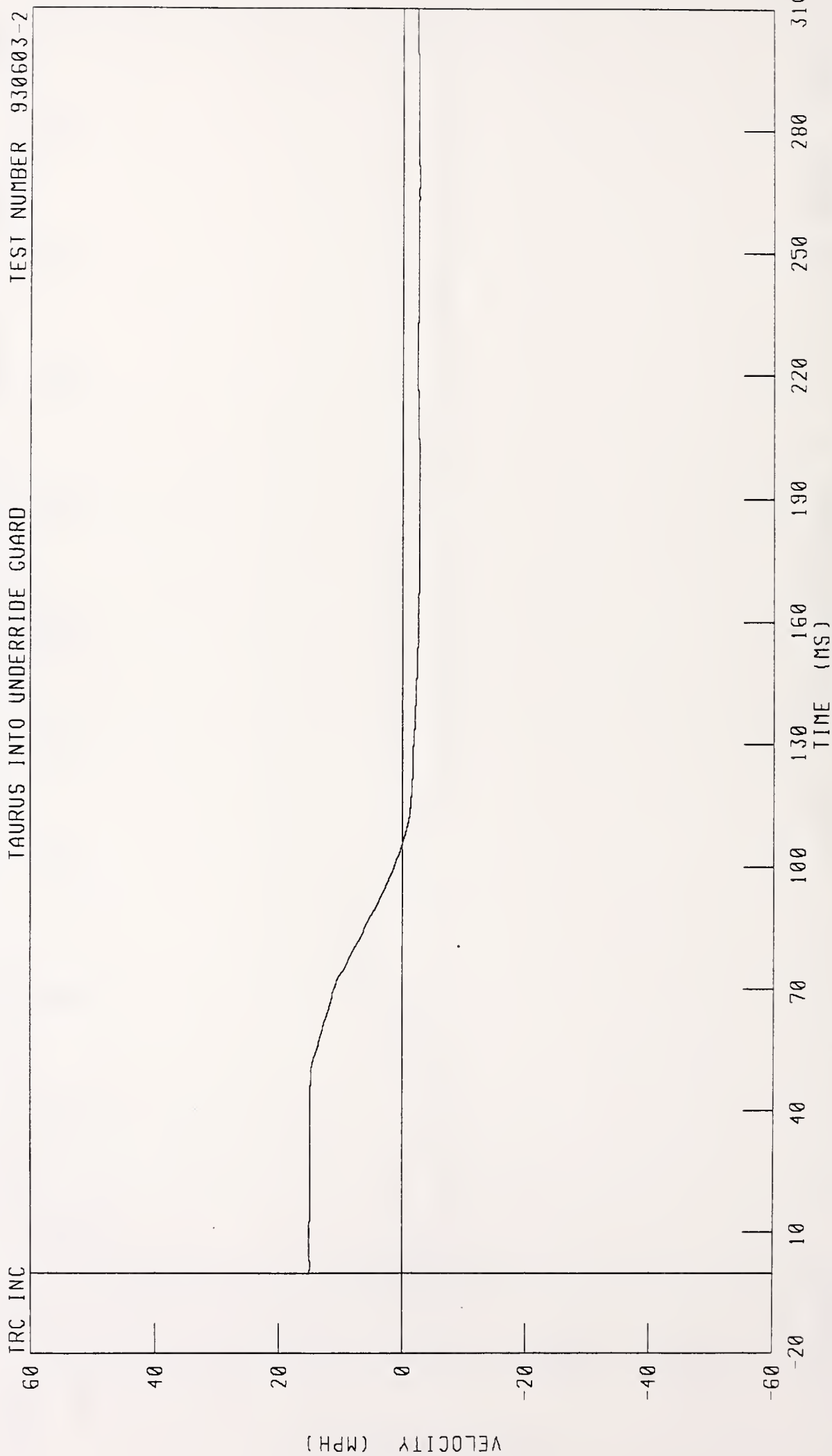
CHANNEL RRSXG1 FILTER CH CLASS 60 PEAK DATA 0 90 G @ 209 38 MS, -18 04 G @ 74 00 MS



1990 FORD TAURUS INTO RIGID HEAVY TRUCK REAR UNDERRIDE GUARD TEST NO 2

RIGHT REAR SILL X-AXIS VELOCITY

TAURUS INTO UNDERRIDE GUARD TEST NUMBER 930603-2

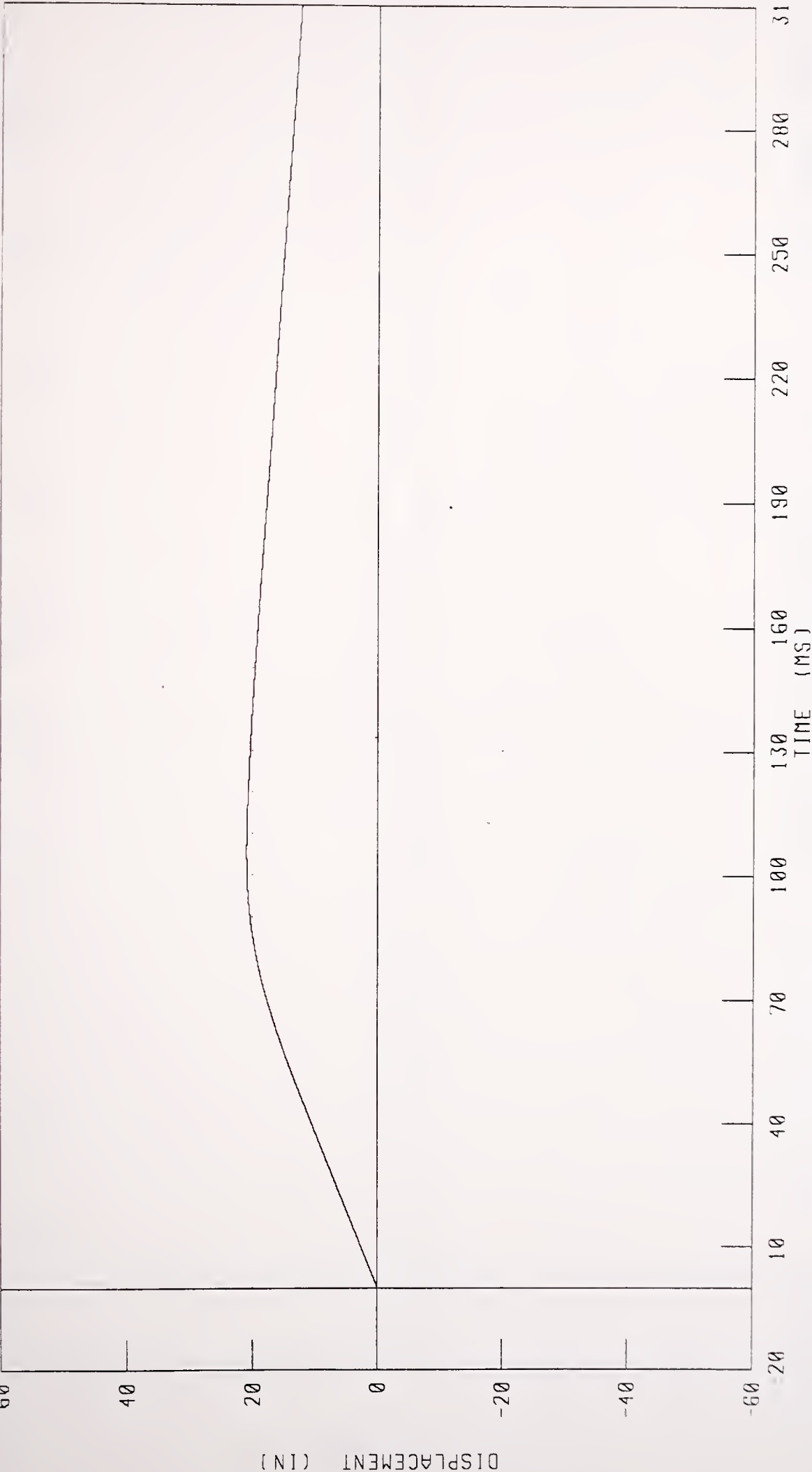


CHANNEL RRSXV1 FILTER CH CLASS 180 PEAK DATA 15 02 MPH @ 7 50 MS, -2 75 MPH @ 182 13 MS

1990 FORD TAURUS INTO RIGID HEAVY TRUCK REAR UNDERRIDE GUARD TEST NO 2  
 RIGHT REAR SILL X-AXIS DISPLACEMENT  
 TAURUS INTO UNDERRIDE GUARD

TEST NUMBER 930603-2

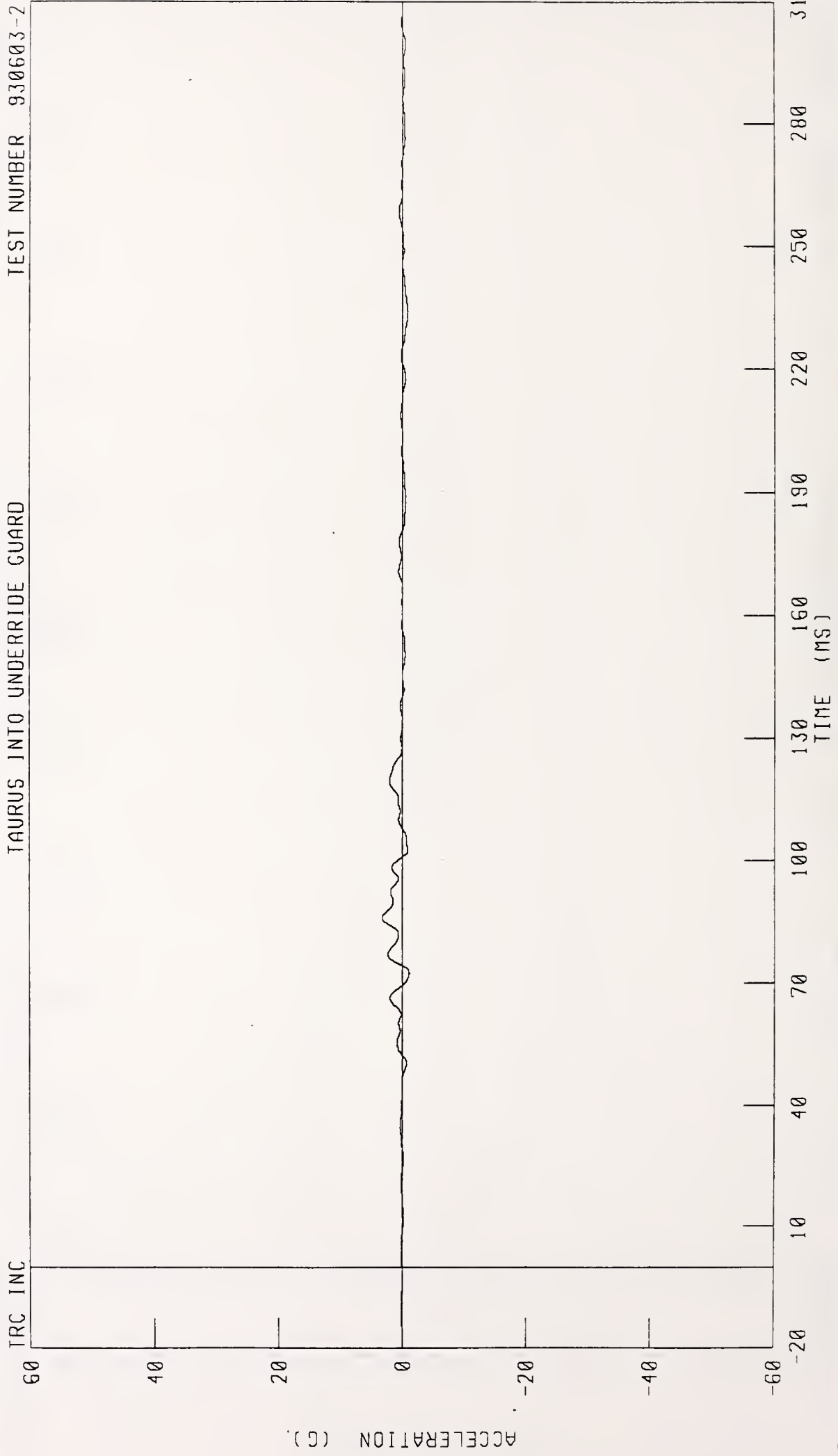
TRC INC



CHANNEL RRSXD1 FILTER CH CLASS 180 PEAK DATA 20 93 IN @ 105 63 MS, 0 00 IN @ 0 00 MS

1990 FORD TAURUS INTO RIGID HEAVY TRUCK REAR UNDERRIDE GUARD TEST NO 2  
RIGHT REAR SILL Y-AXIS ACCELERATION

TAURUS INTO UNDERRIDE GUARD TEST NUMBER 930603-2



CHANNEL RRSYG1 FILTER CH CLASS 60 PEAK DATA 3 29 G @ 85 88 MS, -1 10 G @ 72 50 MS

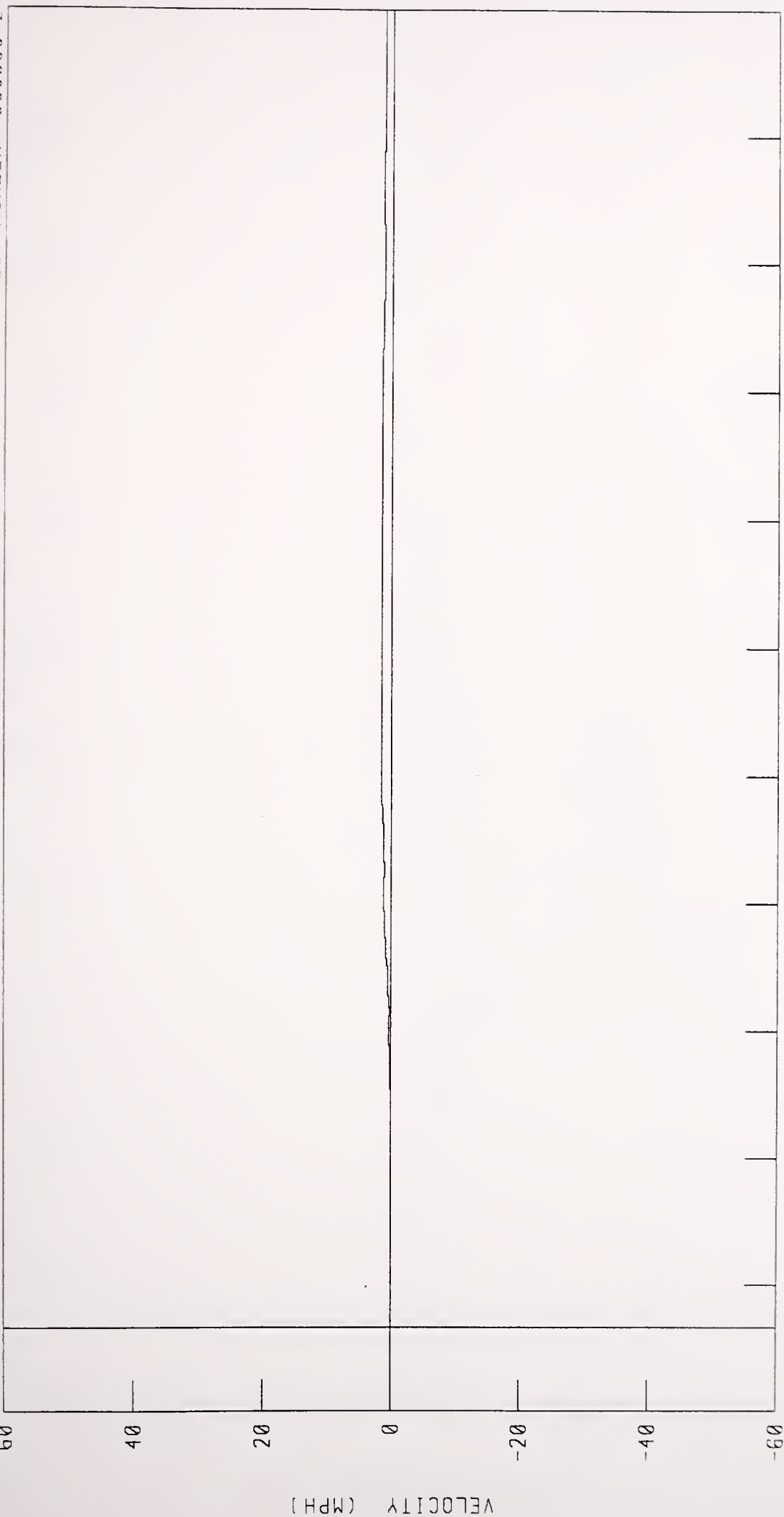
1990 FORD TAURUS INTO RIGID HEAVY TRUCK REAR UNDERRIDE GUARD TEST NO 2

RIGHT REAR SILL Y-AXIS VELOCITY

TRC INC

TAURUS INTO UNDERRIDE GUARD

TEST NUMBER 930603-2



TIME (MS)

PEAK DATA 1 62 MPH @ 180 38 MS, 0 00 MPH @ 0 00 MS

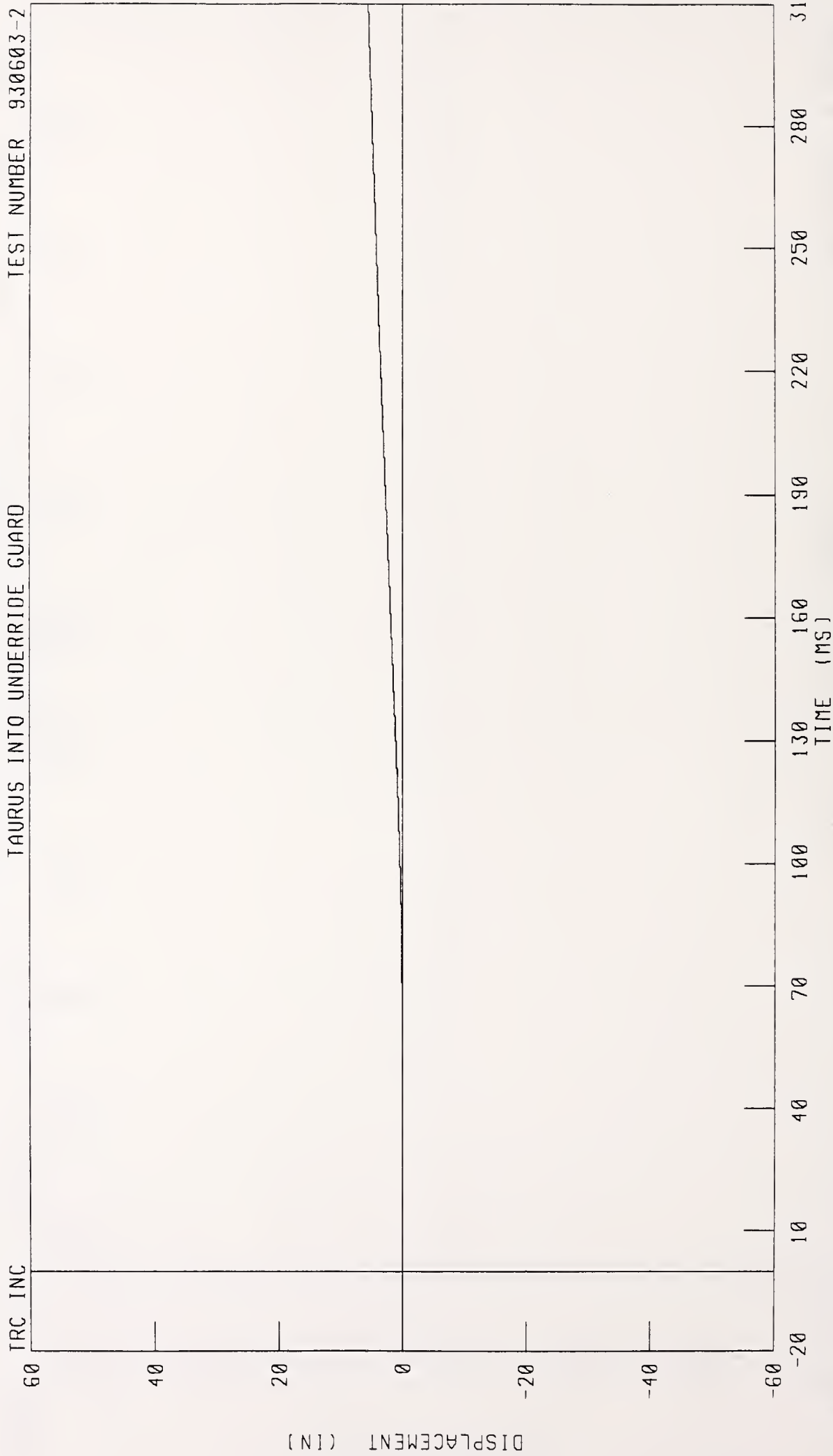
CHANNEL RRSYV1 FILTER CH CLASS 180



1990 FORD TAURUS INTO RIGID HEAVY TRUCK REAR UNDERRIDE GUARD TEST NO 2

RIGHT REAR SILL Y-AXIS DISPLACEMENT

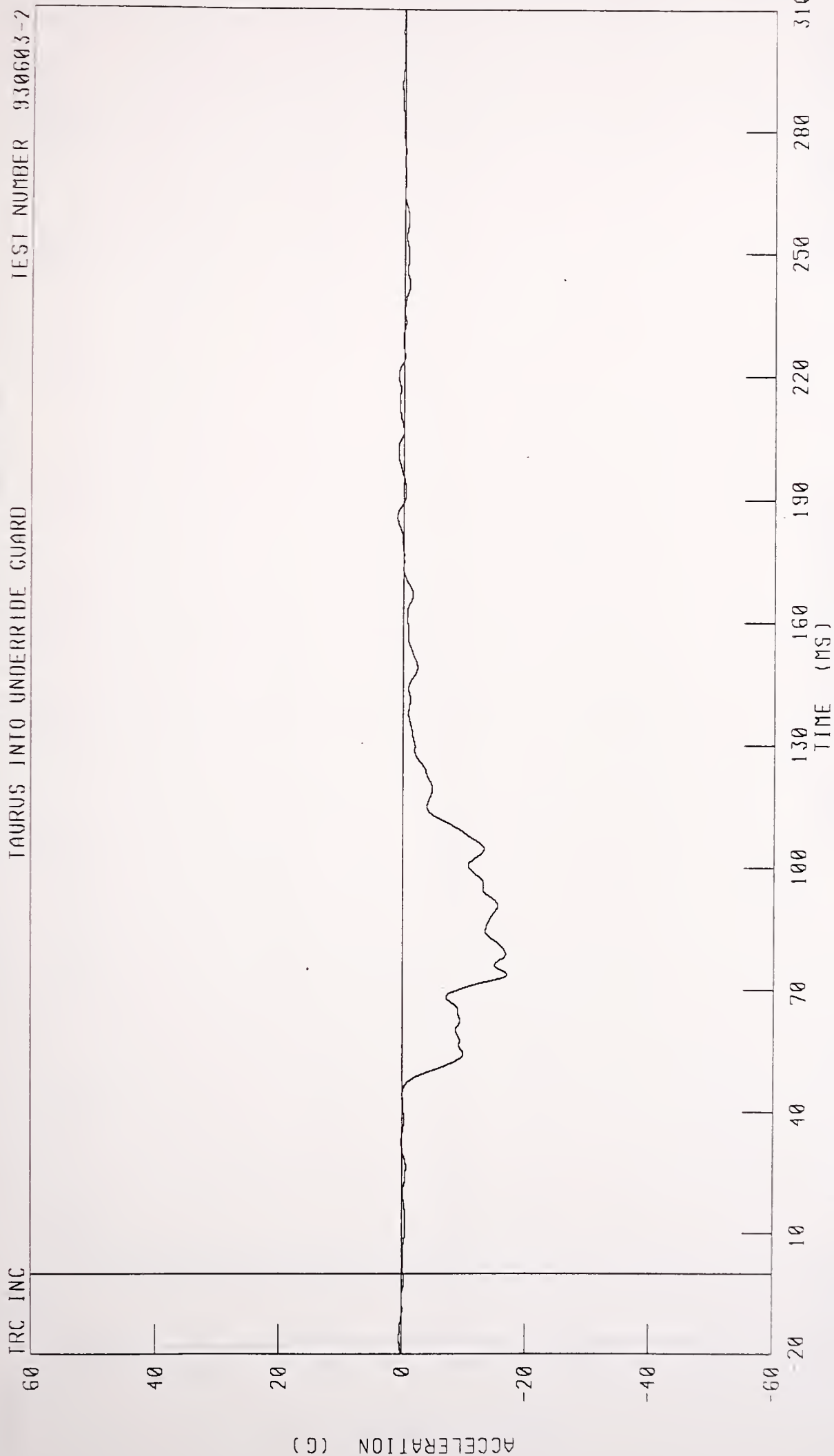
TAURUS INTO UNDERRIDE GUARD TEST NUMBER 930603-2



CHANNEL RRSYD1 FILTER CH CLASS 180 PEAK DATA 5 55 IN @ 310 00 MS, 0 00 IN @ 0 00 MS

1990 FORD TAURUS INTO RIGID HEAVY TRUCK REAR UNDERRIDE GUARD TEST NO 2  
VEHICLE CENTER OF GRAVITY X-AXIS ACCELERATION

TAURUS INTO UNDERRIDE GUARD TEST NUMBER 930603-2

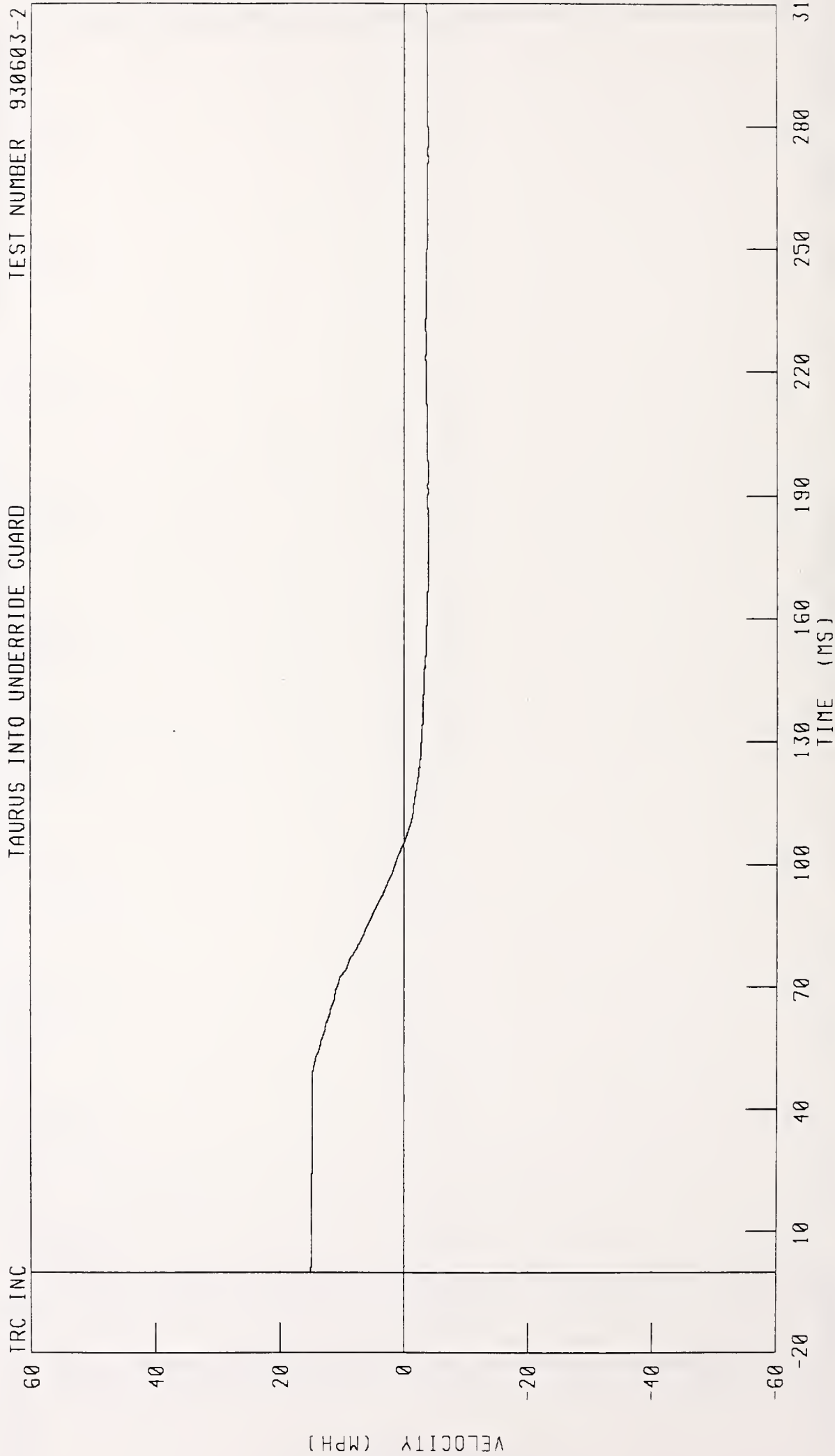


CHANNEL VCCXG1 FILTER CH CLASS 60 PEAK DATA 1 01 G @ 185.50 MS, -16 90 G @ 73 50 MS

1990 FORD TAURUS INTO RIGID HEAVY TRUCK REAR UNDERRIDE GUARD TEST NO 2  
 VEHICLE CENTER OF GRAVITY X-AXIS VELOCITY

TEST NUMBER 930603-2

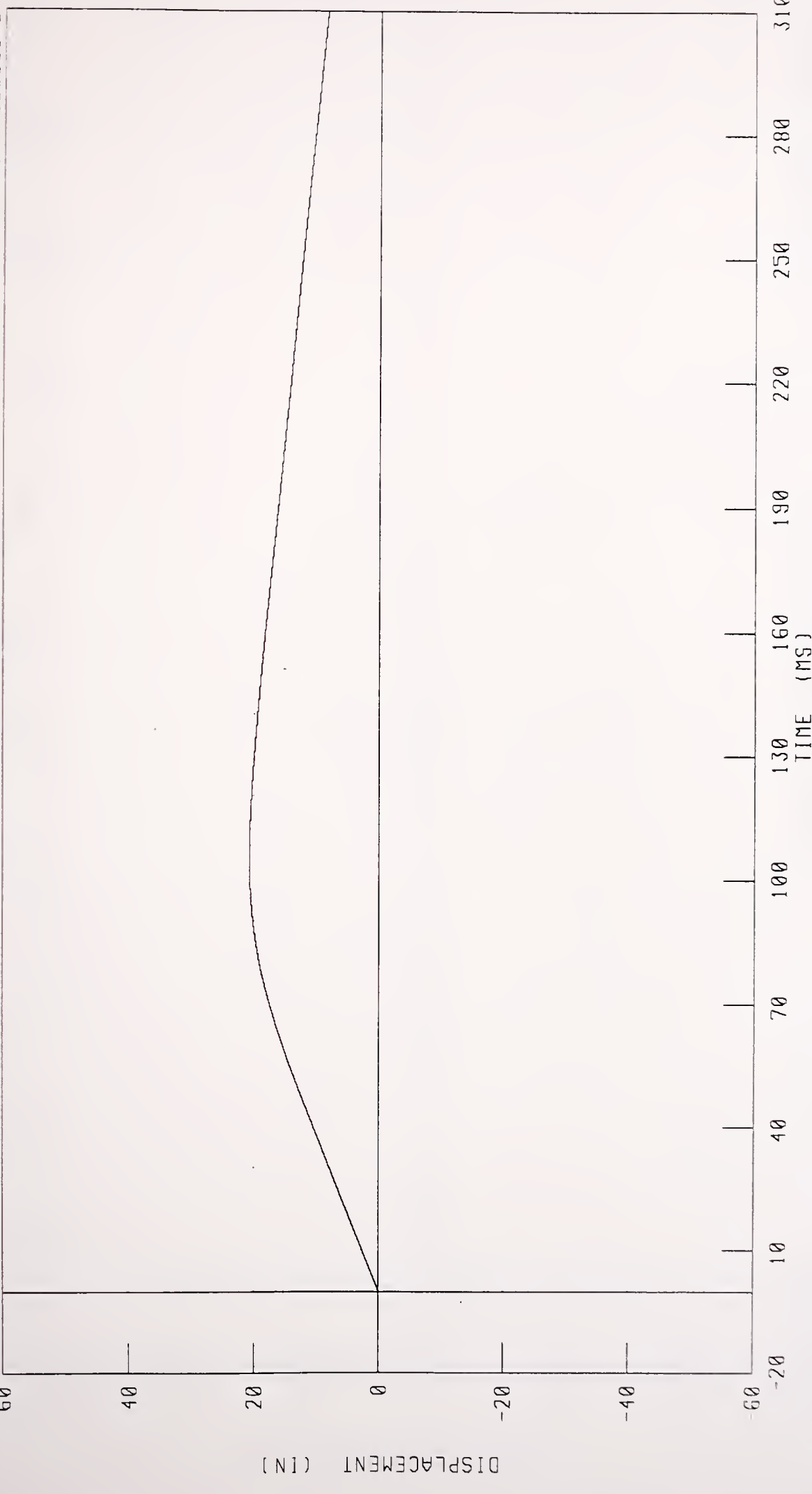
TAURUS INTO UNDERRIDE GUARD



CHANNEL VCGXV1 FILTER CH CLASS 180 PEAK DATA 15 00 MPH @ 0 50 MS, -3 91 MPH @ 177 75 MS

1990 FORD TAURUS INTO RIGID HEAVY TRUCK REAR UNDERRIDE GUARD TEST NO 2  
VEHICLE CENTER OF GRAVITY X-AXIS DISPLACEMENT

TRC INC  
TAURUS INTO UNDERRIDE GUARD  
TEST NUMBER 930603-2

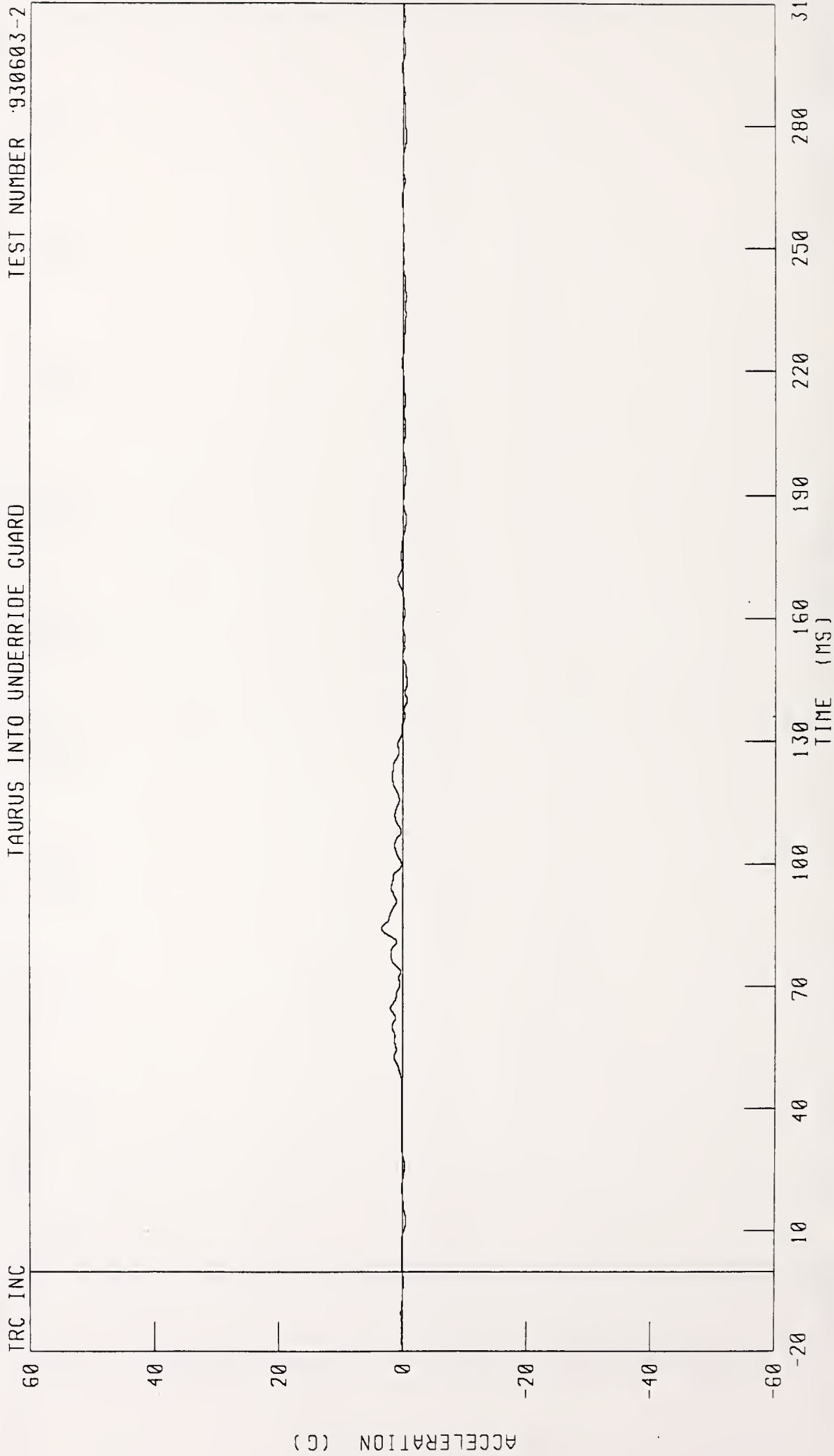


CHANNEL VCGX01 FILTER CH CLASS 180  
PEAK DATA 20 73 IN @ 105 25 MS, 0 00 IN @ 0 00 MS



1990 FORD TAURUS INTO RIGID HEAVY TRUCK REAR UNDERRIDE GUARD TEST NO 2  
 VEHICLE CENTER OF GRAVITY Y-AXIS ACCELERATION

TAURUS INTO UNDERRIDE GUARD TEST NUMBER 930603-2



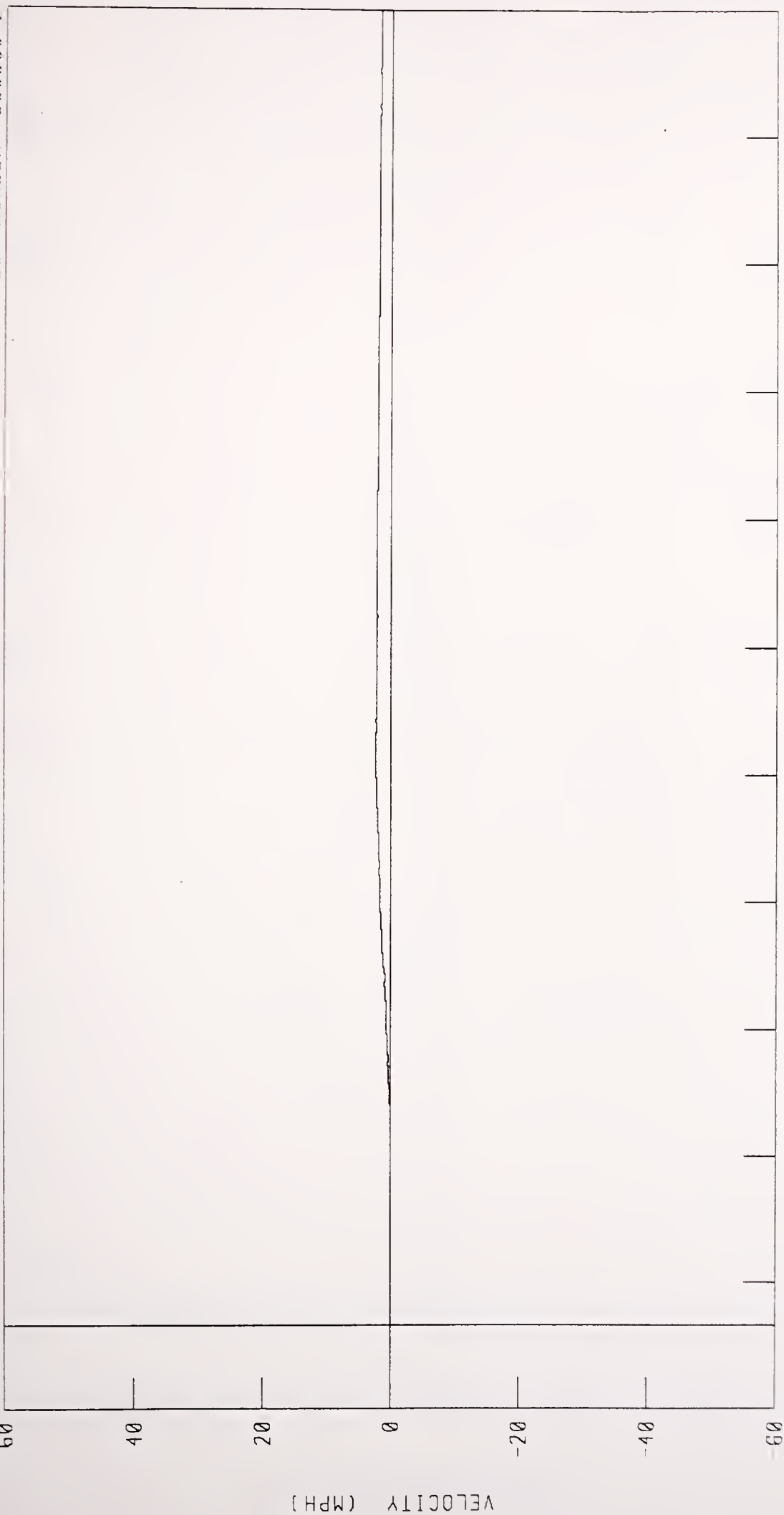
CHANNEL VCGYG1 FILTER CH CLASS 60 PEAK DATA 3 43 G @ 84 13 MS, -0 75 G @ 144 25 MS

# 1990 FORD TAURUS INTO RIGID HEAVY TRUCK REAR UNDERRIDE GUARD TEST NO 2

VEHICLE CENTER OF GRAVITY Y-AXIS VELOCITY

TAURUS INTO UNDERRIDE GUARD TEST NUMBER 930603-2

IRC INC



TIME (MS)

PEAK DATA 2 37 MPH @ 134 38 MS, -0 04 MPH @ 28 13 MS

CHANNEL VCGYV1 FILTER CH CLASS 180

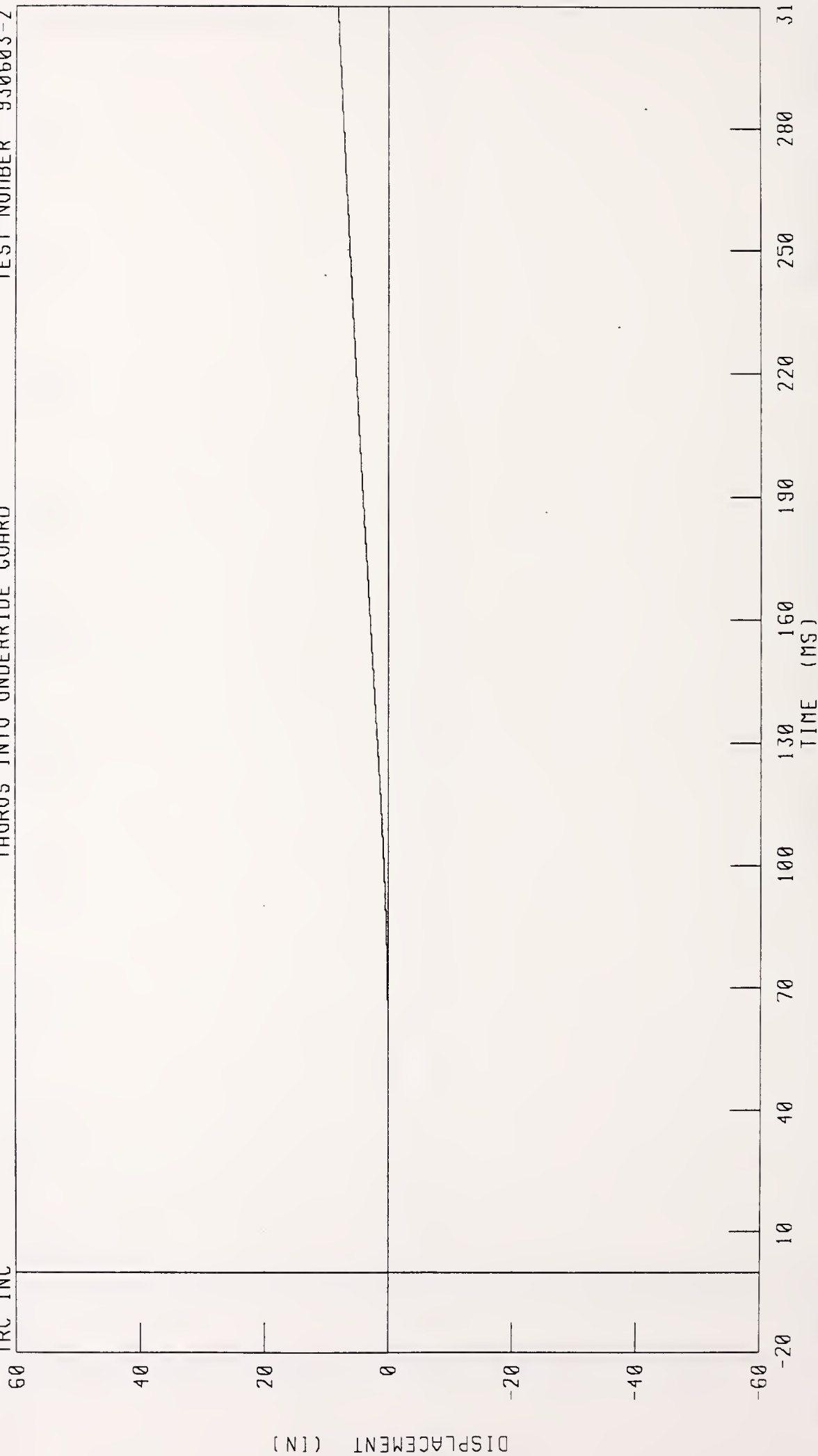
1990 FORD TAURUS INTO RIGID HEAVY TRUCK REAR UNDERRIDE GUARD TEST NO 2

VEHICLE CENTER OF GRAVITY Y-AXIS DISPLACEMENT

TAURUS INTO UNDERRIDE GUARD

TEST NUMBER 930603-2

TRC INC



CHANNEL VCGYD1 FILTER CH CLASS 180

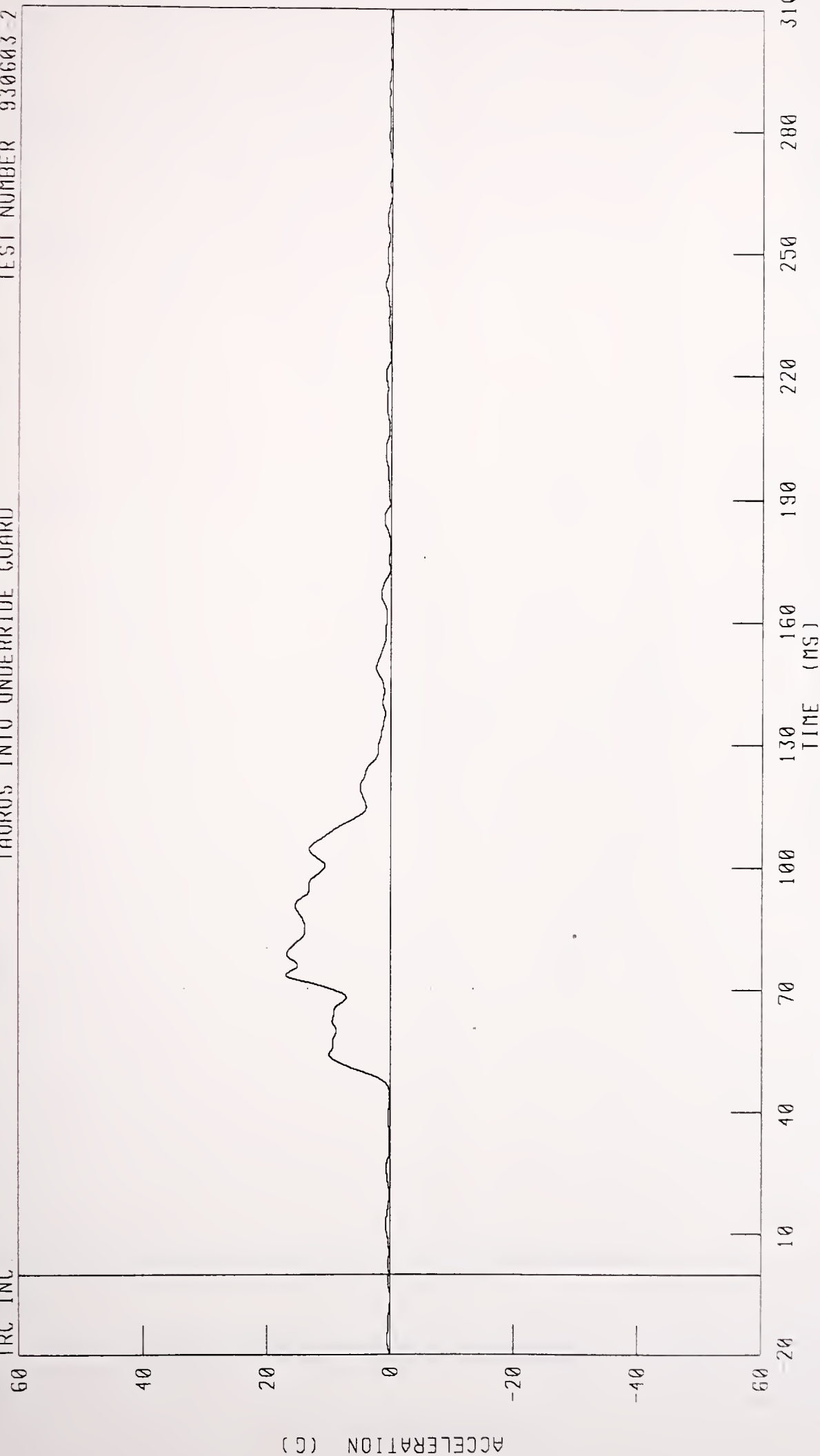
PEAK DATA 8 17 IN @ 310 00 MS, 0 00 IN @ 37 63 MS

1990 FORD TAURUS INTO RIGID HEAVY TRUCK REAR UNDERRIDE GUARD TEST NO 2  
VEHICLE CENTER OF GRAVITY RESULTANT ACCELERATION

TEST NUMBER 930603-2

TAURUS INTO UNDERRIDE GUARD

TRC INC



CHANNEL VCGRG1 FILTER CH CLASS 60

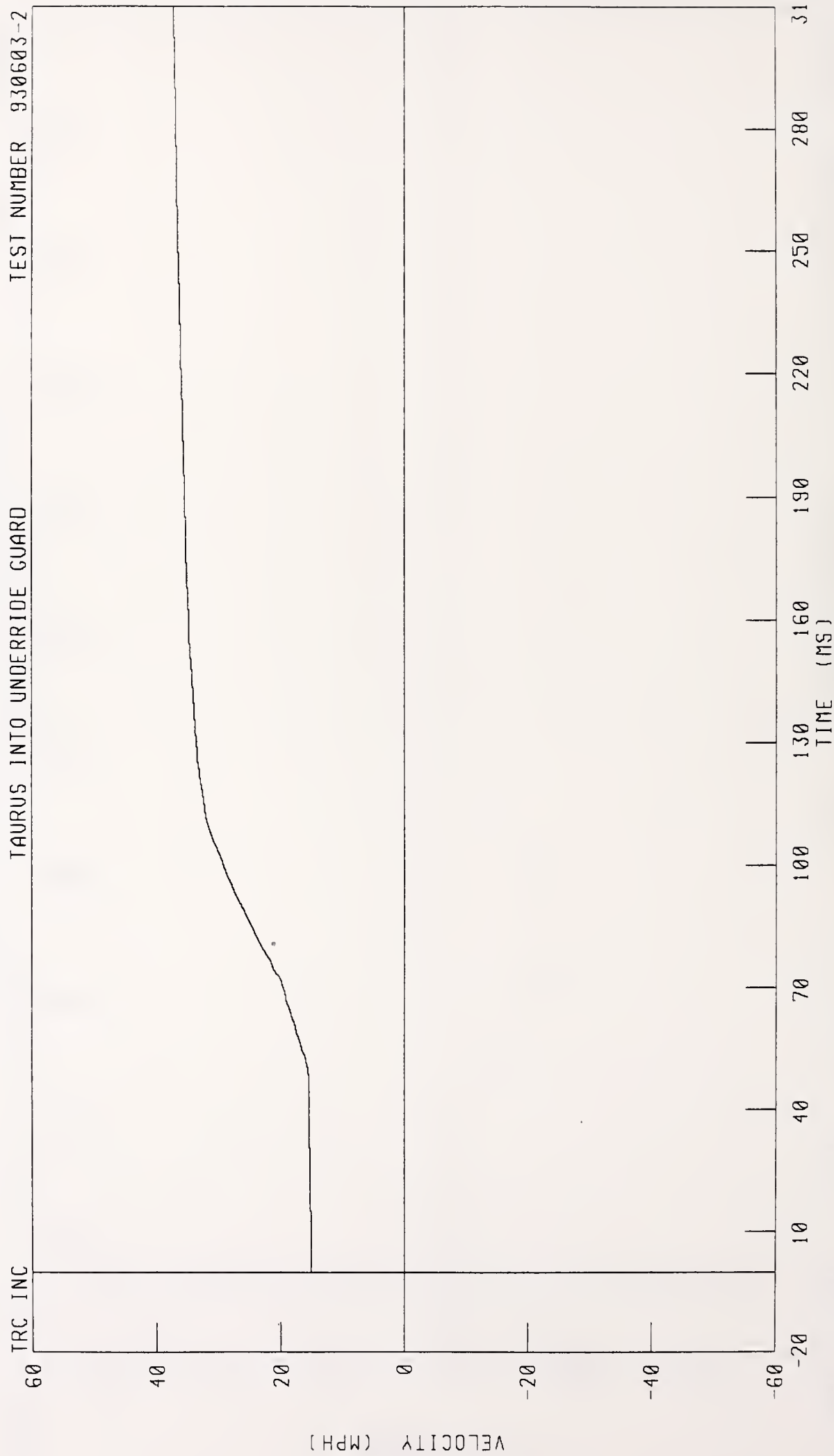
PEAK DATA 16 91 G @ 73 50 MS, 0 03 G @ 272 50 MS



1990 FORD TAURUS INTO RIGID HEAVY TRUCK REAR UNDERRIDE GUARD TEST NO 2

VEHICLE CENTER OF GRAVITY RESULTANT VELOCITY

TAURUS INTO UNDERRIDE GUARD TEST NUMBER 930603-2



CHANNEL VCGRV1 FILTER CH CLASS 180

PEAK DATA 37 25 MPH @ 310 00 MS, 15 00 MPH @ 0 00 MS

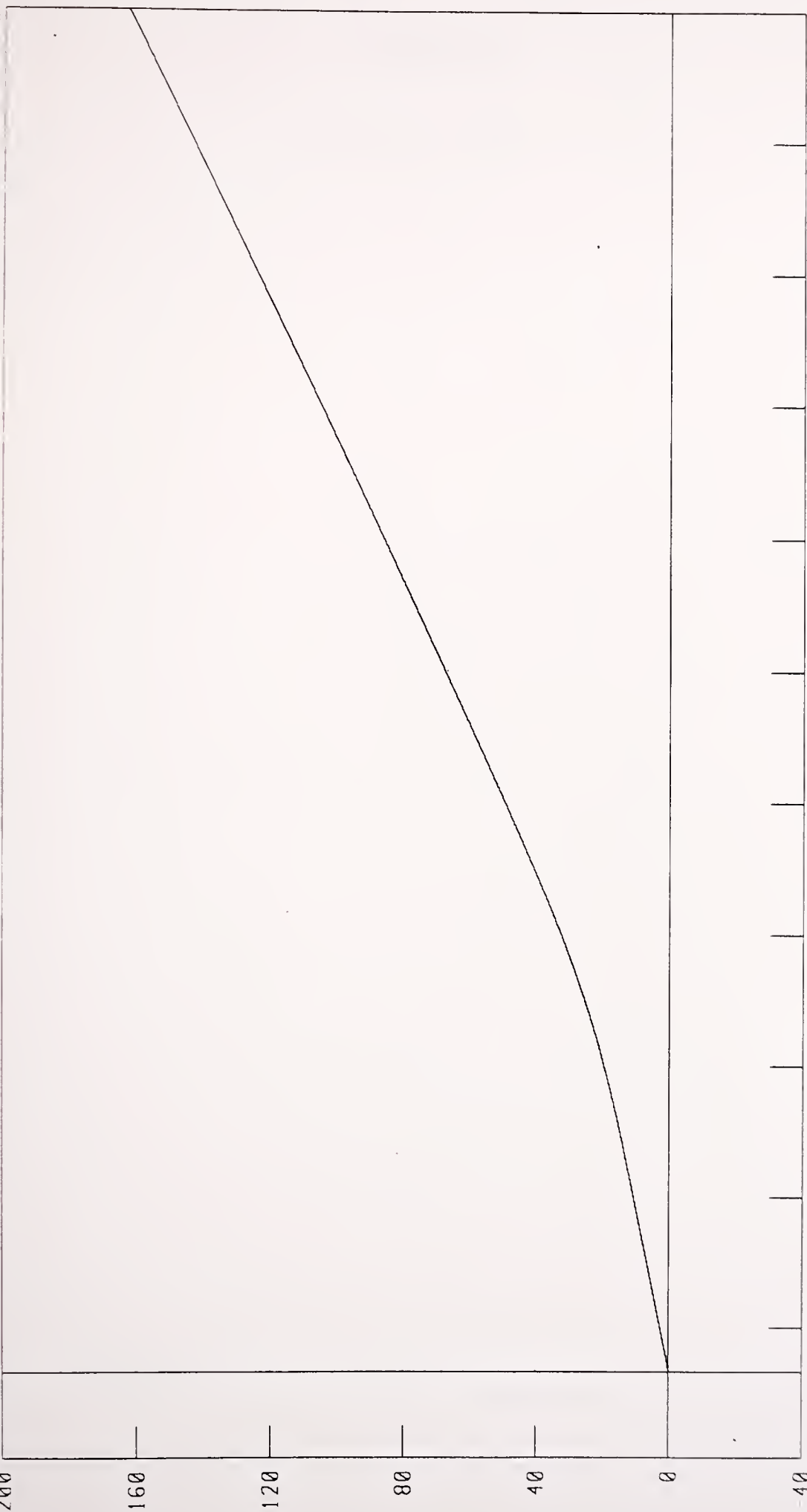
1990 FORD TAURUS INTO RIGID HEAVY TRUCK REAR UNDERRIDE GUARD TEST NO 2  
 VEHICLE CENTER OF GRAVITY RESULTANT DISPLACEMENT

TEST NUMBER 930603-2

TAURUS INTO UNDERRIDE GUARD

TRC INC

200



310 280 250 220 190 160 130 100 70 40 10 0 -20 -40

TIME (MS)

PEAK DATA 162.99 IN @ 310.00 MS, 0.00 IN @ 0.00 MS

CHANNEL VCCRD1 FILTER CH CLASS 180



DATA PLOTS

TEST NO. 930603-3

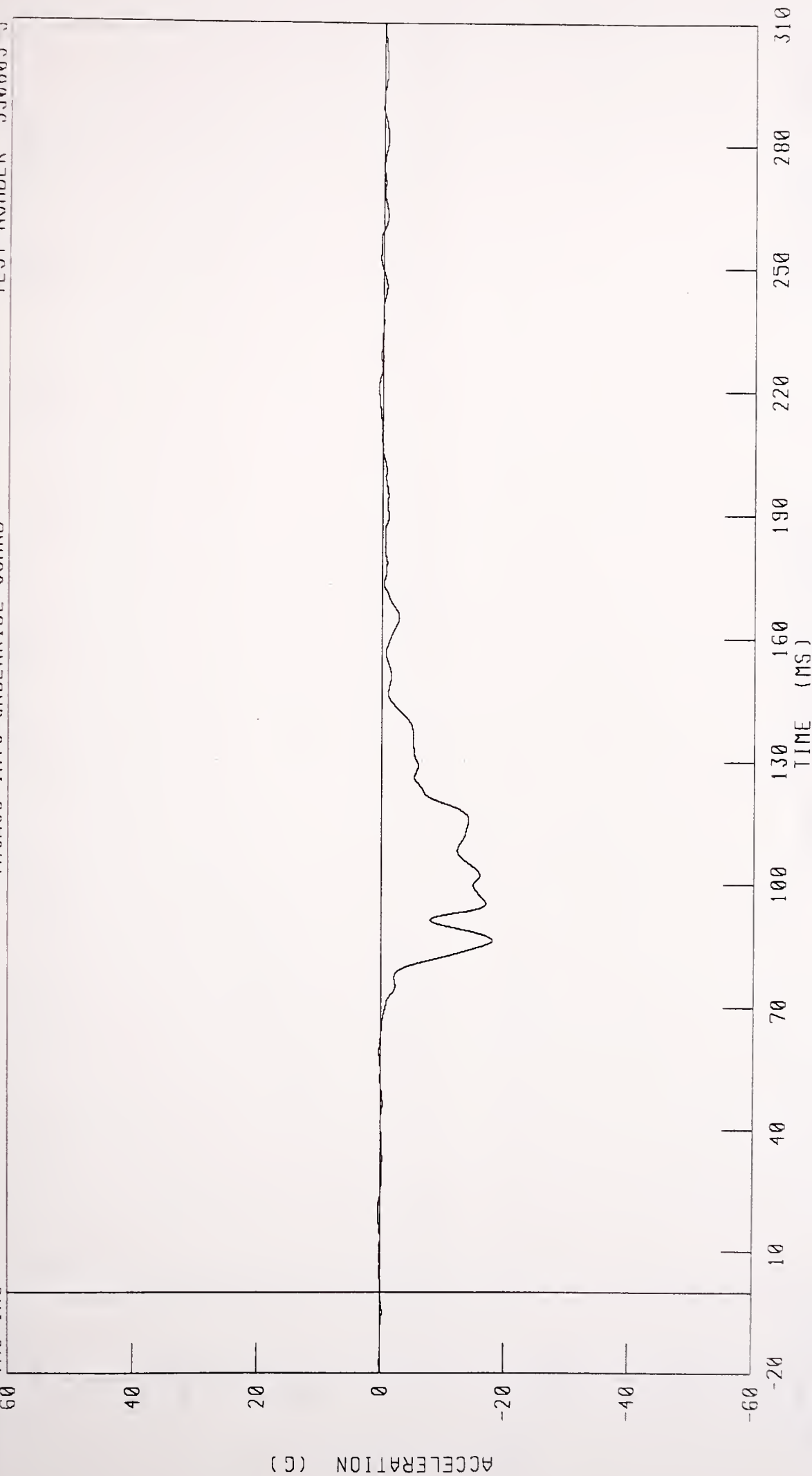




1990 FORD TAURUS INTO RIGID HEAVY TRUCK REAR UNDERRIDE GUARD TEST NO 3  
 LEFT REAR SILL X-AXIS ACCELERATION

TAURUS INTO UNDERRIDE GUARD TEST NUMBER 930603 3

TRC INC

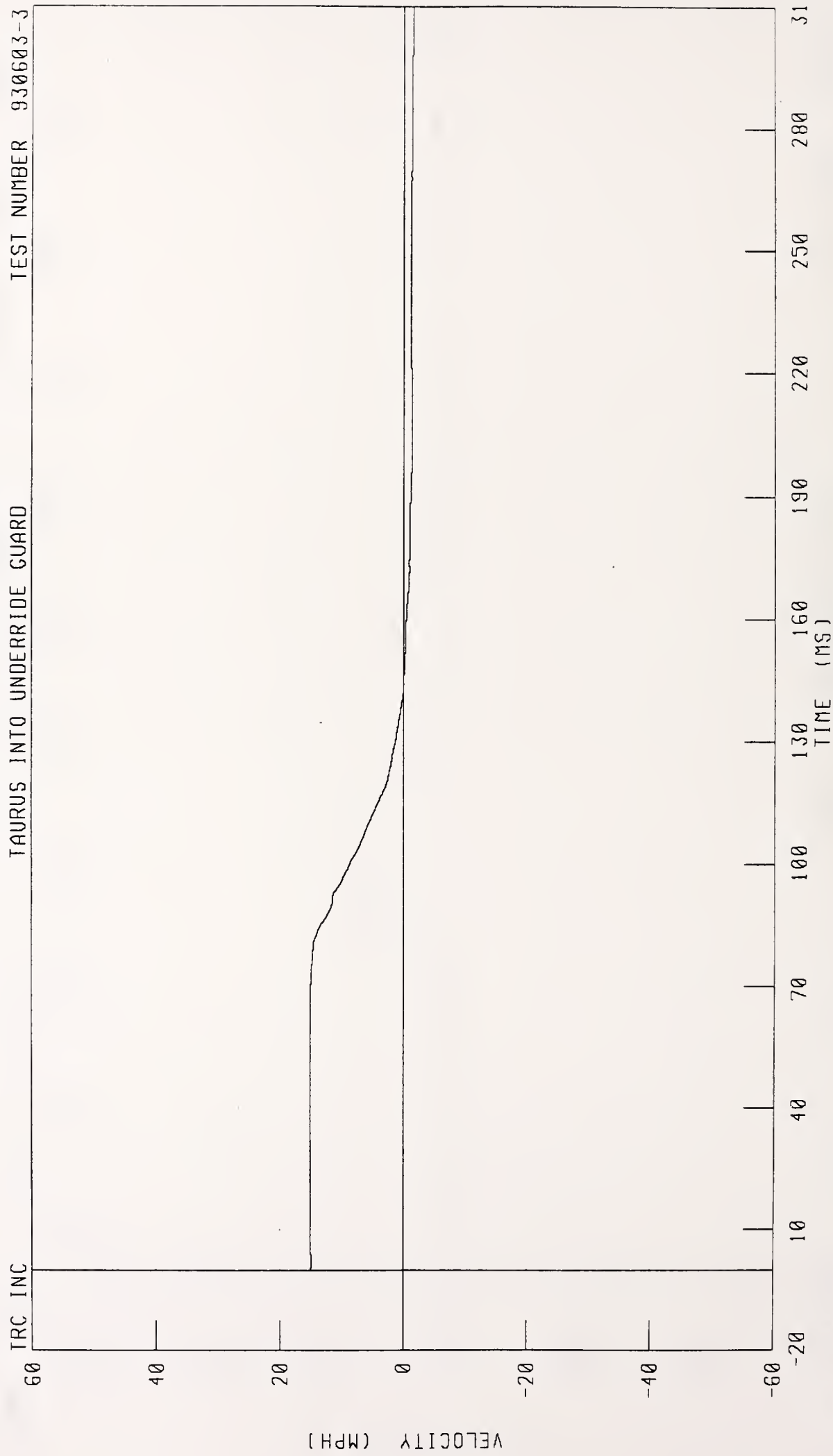


CHANNEL LRSXG1 FILTER CH CLASS 60 PEAK DATA 0 70 G @ 220 88 MS, -18 00 G @ 86 13 MS

1990 FORD TAURUS INTO RIGID HEAVY TRUCK REAR UNDERRIDE GUARD TEST NO 3

LEFT REAR SILL X-AXIS VELOCITY

TAURUS INTO UNDERRIDE GUARD TEST NUMBER 930603-3



CHANNEL LRSXV1 FILTER CH CLASS 180

PEAK DATA 15 09 MPH @ 23 00 MS, -1 53 MPH @ 310 00 MS

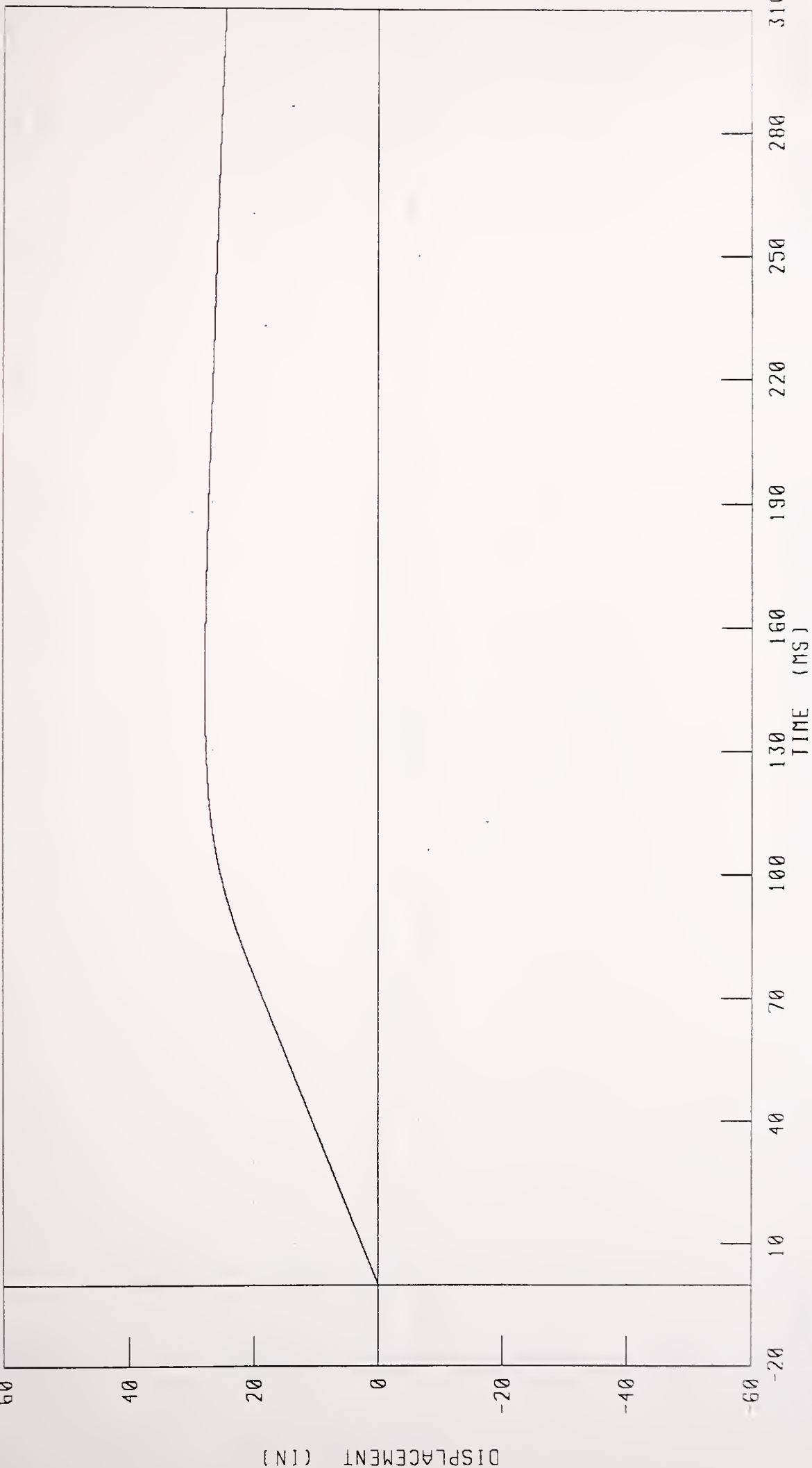
1990 FORD TAURUS INTO RIGID HEAVY TRUCK REAR UNDERRIDE GUARD TEST NO 3

LEFT REAR SILL X-AXIS DISPLACEMENT

TRC INC

TAURUS INTO UNDERRIDE GUARD

TEST NUMBER 930603-3



CHANNEL 1 RSXD1 FILTER CH CLASS 180 PEAK DATA 27.77 IN @ 143.50 MS, 0.00 IN @ 0.00 MS

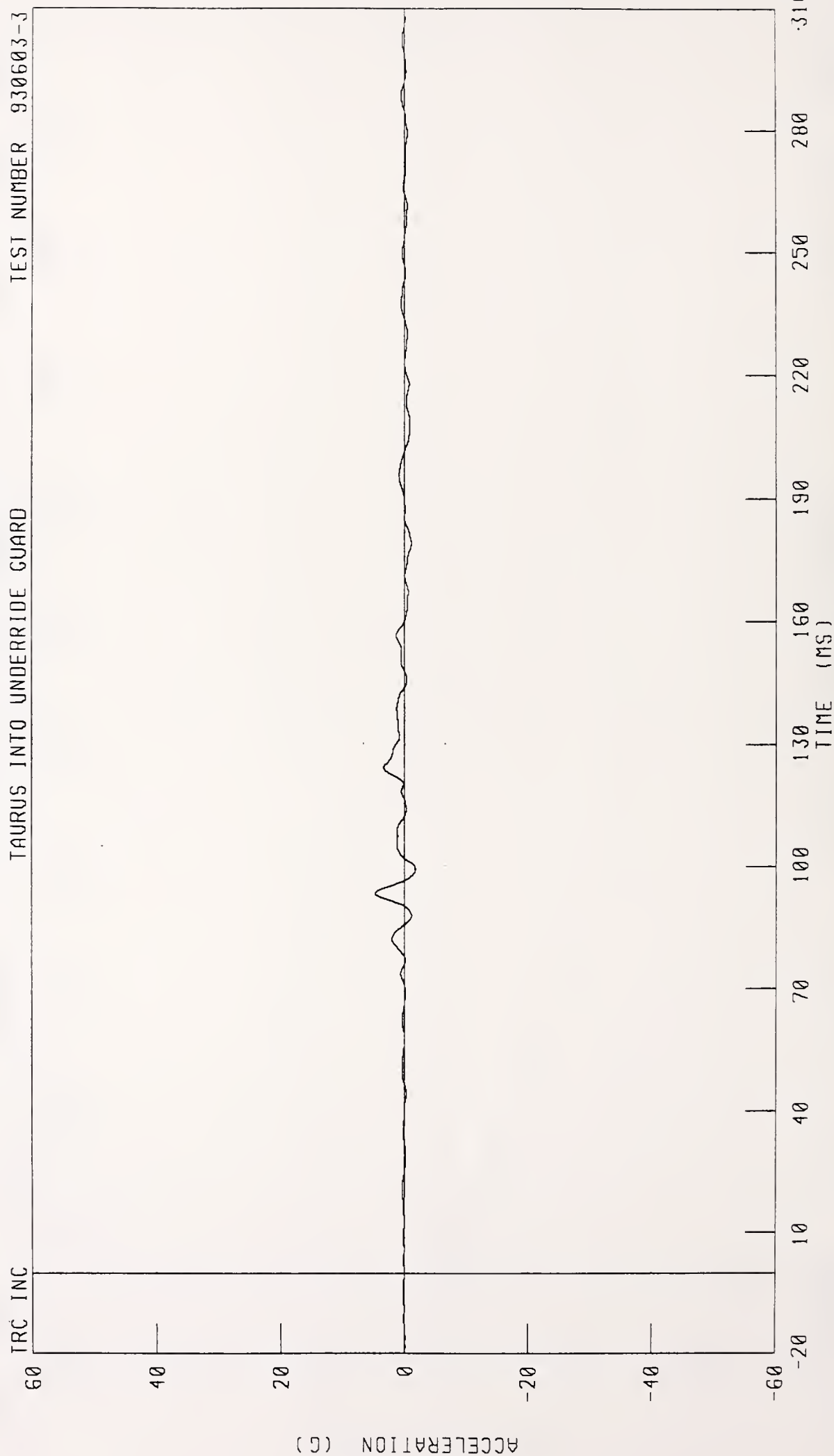


1990 FORD TAURUS INTO RIGID HEAVY TRUCK REAR UNDERRIDE GUARD TEST NO 3

LEFT REAR SILL Y-AXIS ACCELERATION

TAURUS INTO UNDERRIDE GUARD

TEST NUMBER 930603-3



CHANNEL LRSYG1 FILTER CH CLASS 60

PEAK DATA 4 82 G @ 93 38 MS, -1 77 G @ 99 25 MS

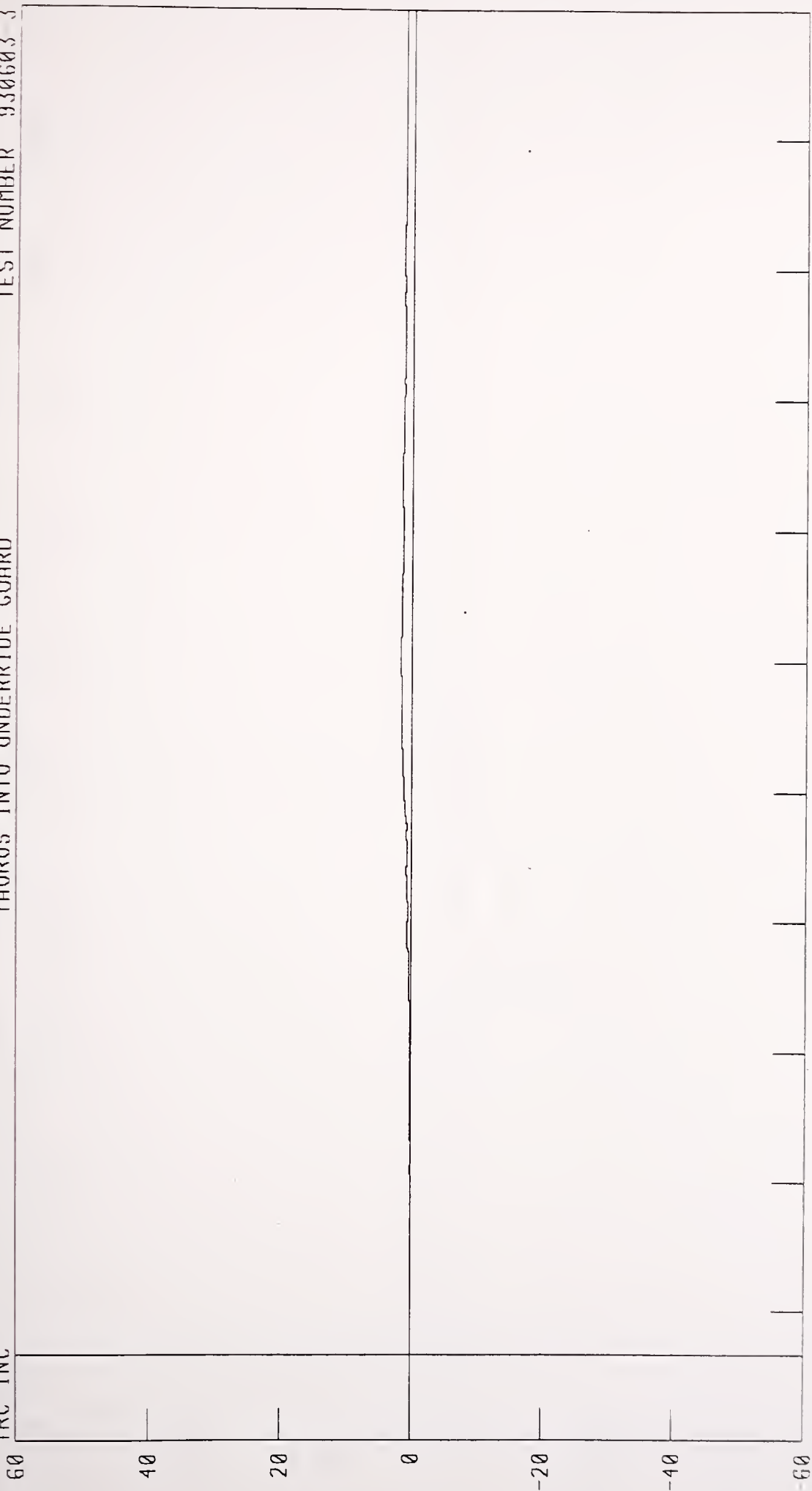
# 1990 FORD TAURUS INTO RIGID HEAVY TRUCK REAR UNDERRIDE GUARD TEST NO 3

LEFT REAR SILL Y-AXIS VELOCITY

TAURUS INTO UNDERRIDE GUARD

TEST NUMBER 930603 3

TRC INC



TIME (MS)

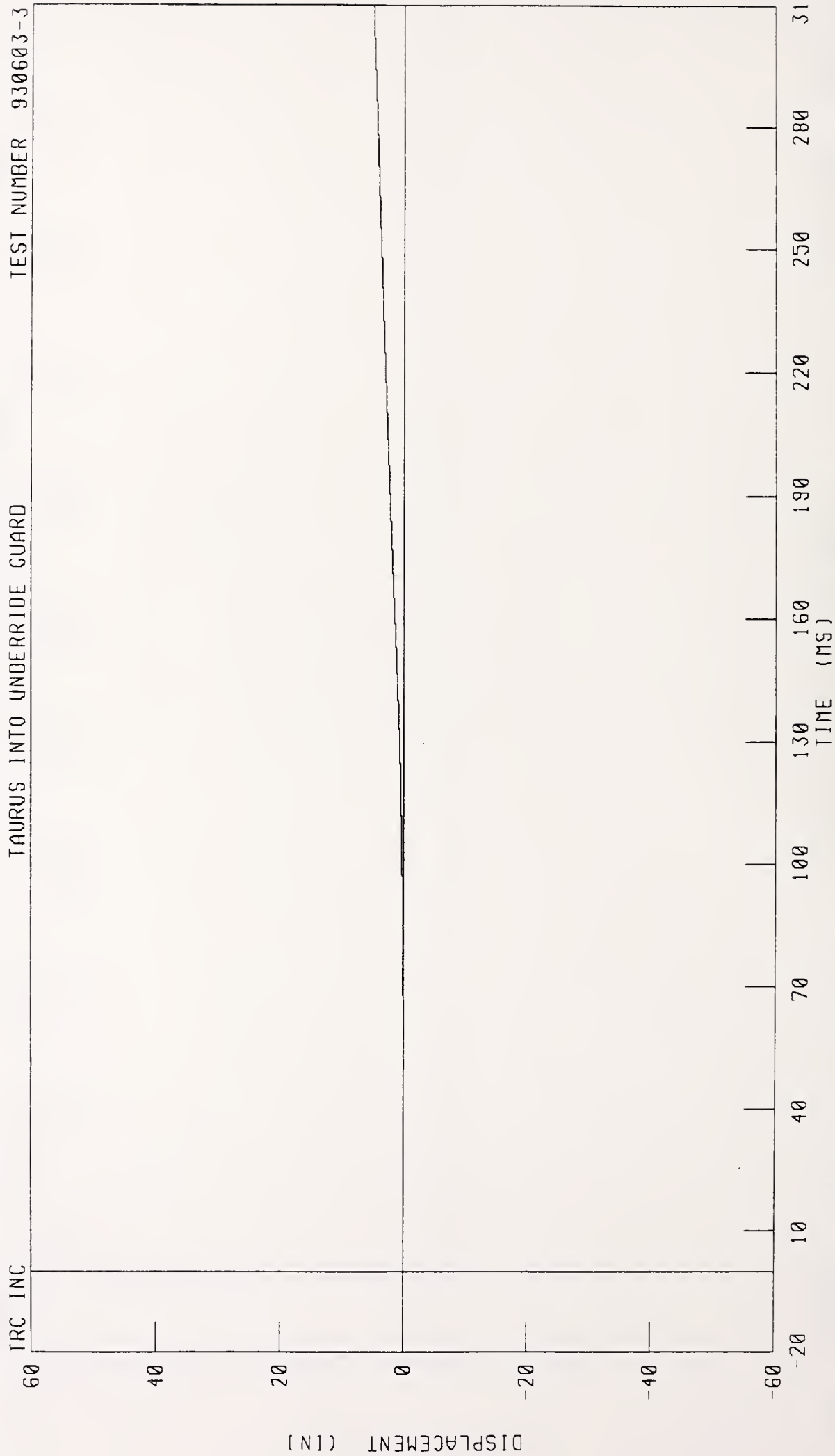
PEAK DATA 1 67 MPH @ 158 38 MS, 0 00 MPH @ 0 00 MS

CHANNEL LRSYV1 FILTER CH CLASS 180

1990 FORD TAURUS INTO RIGID HEAVY TRUCK REAR UNDERRIDE GUARD TEST NO 3

LEFT REAR SILL Y-AXIS DISPLACEMENT

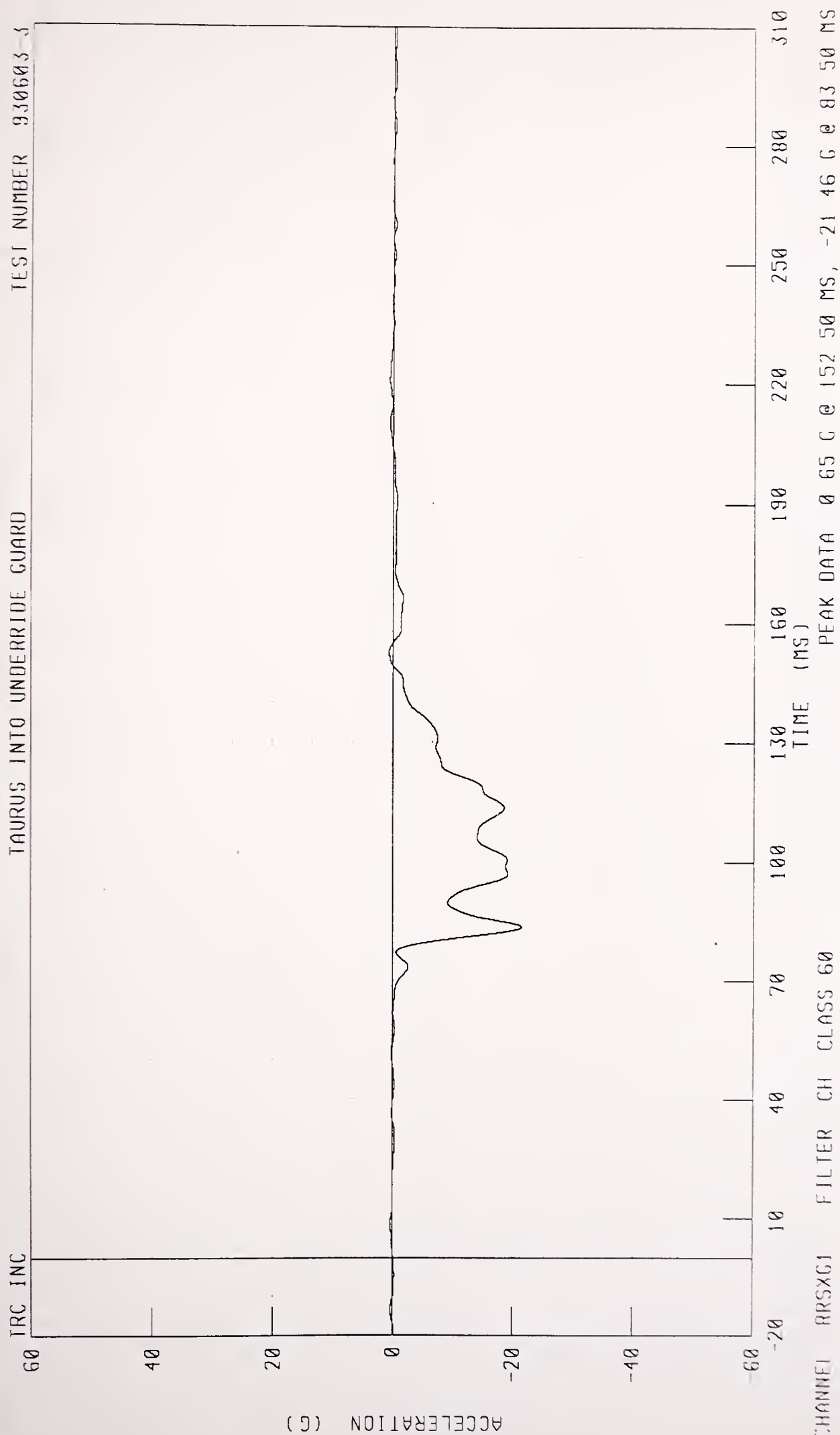
TAURUS INTO UNDERRIDE GUARD TEST NUMBER 930603-3



CHANNEL LRSYD1 FILTER CH CLASS 180 PEAK DATA 5 01 IN @ 310 00 MS, 0 00 IN @ 0 00 MS

1990 FORD TAURUS INTO RIGID HEAVY TRUCK REAR UNDERRIDE GUARD TEST NO 3  
RIGHT REAR SILL X-AXIS ACCELERATION

TRC INC  
TAURUS INTO UNDERRIDE GUARD  
TEST NUMBER 930603-3



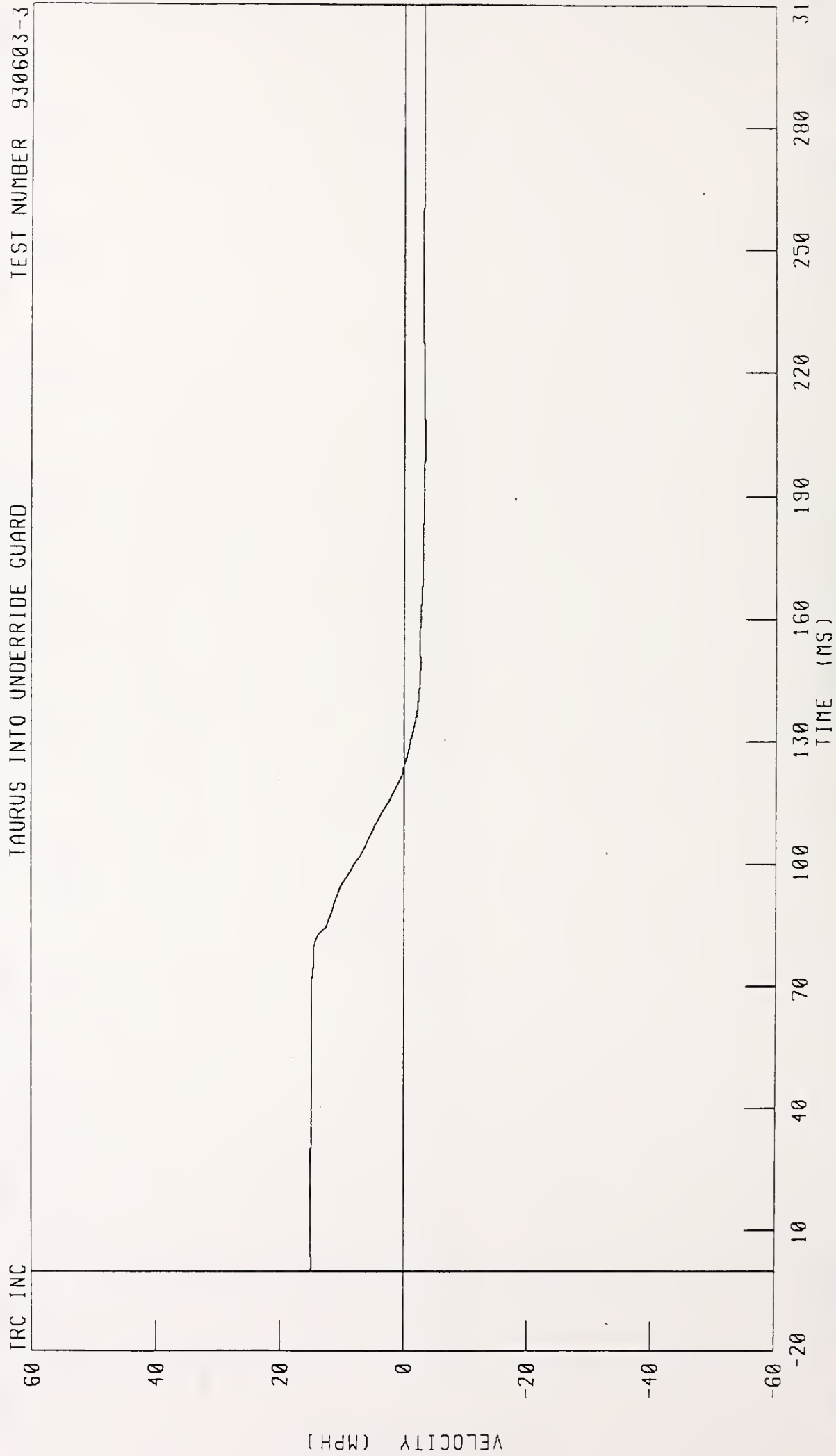
CHANNEL RRSXG1 FILTER CH CLASS 60  
PEAK DATA 0 65 G @ 152 50 MS, -21 46 G @ 83 50 MS



1990 FORD TAURUS INTO RIGID HEAVY TRUCK REAR UNDERRIDE GUARD TEST NO 3

RIGHT REAR SILL X-AXIS VELOCITY

TAURUS INTO UNDERRIDE GUARD TEST NUMBER 930603-3

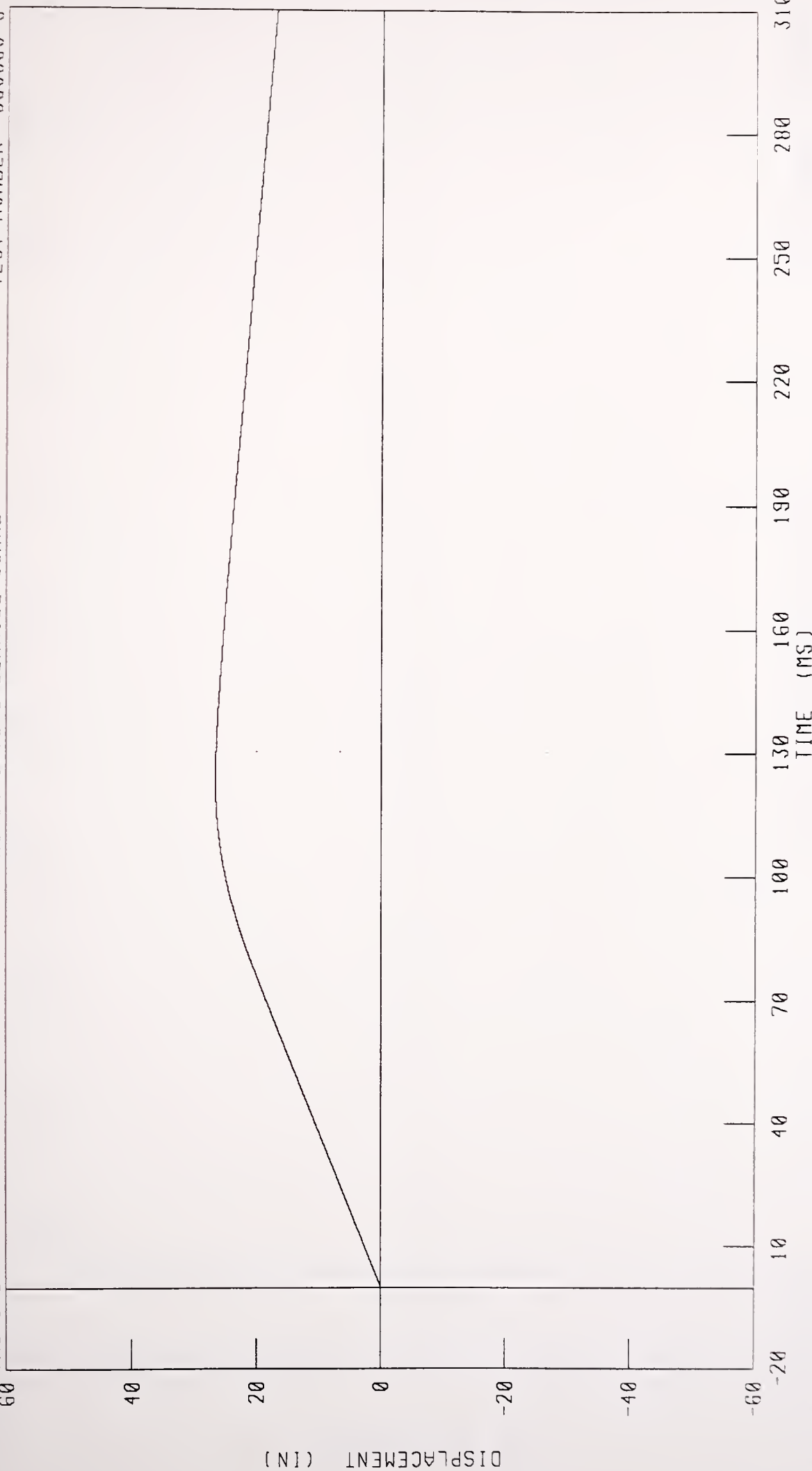


PEAK DATA 15 05 MPH @ 11 25 MS, -3 32 MPH @ 202.50 MS

1990 FORD TAURUS INTO RIGID HEAVY TRUCK REAR UNDERRIDE GUARD TEST NO 3  
 RIGHT REAR SILL X-AXIS DISPLACEMENT

TAURUS INTO UNDERRIDE GUARD TEST NUMBER 930603-3

TRC INC



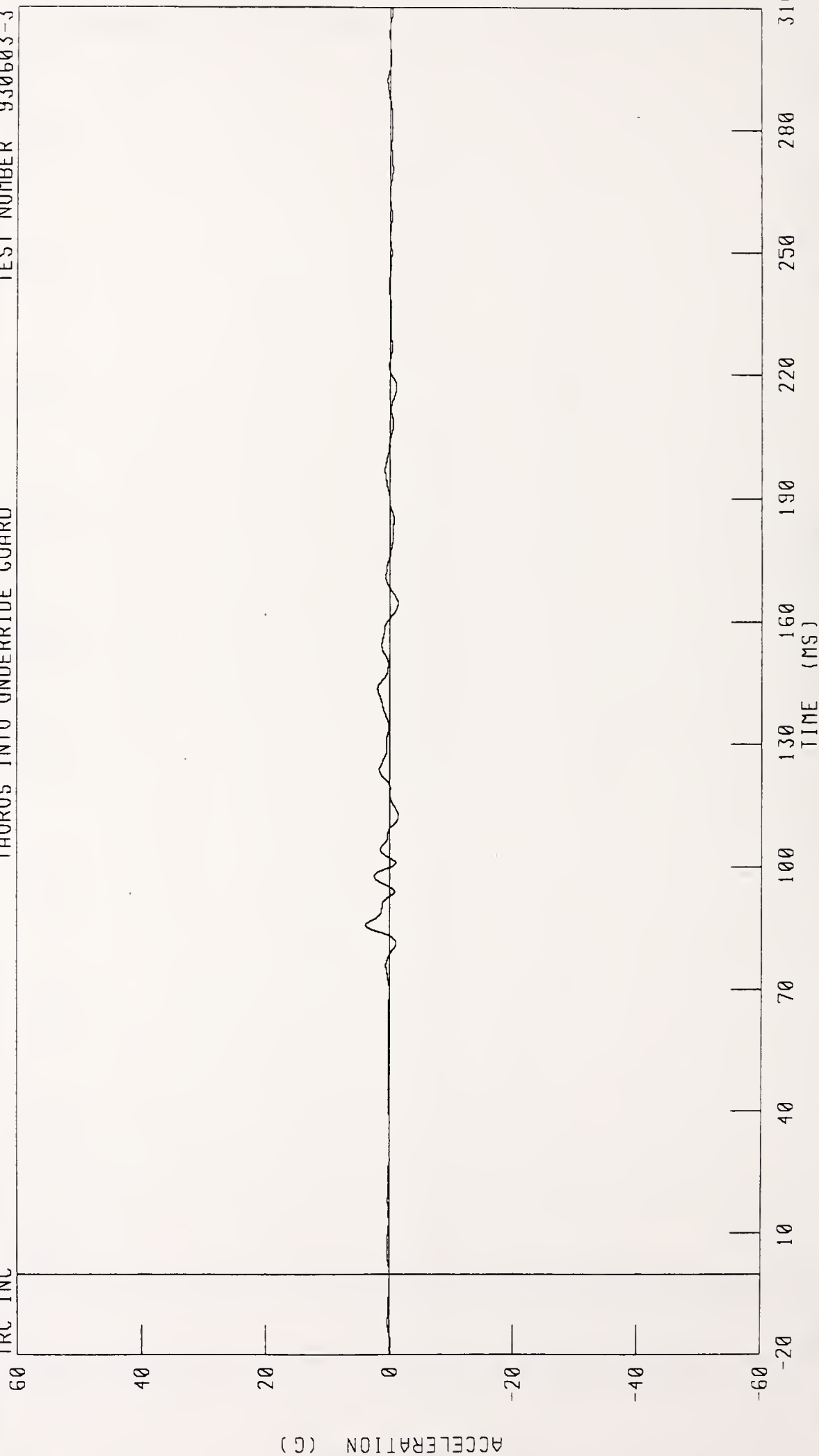
CHANNEL RRSXD1 FILTER CH CLASS 180 PEAK DATA 26 58 IN @ 123 88 MS, 0 00 IN @ 0 00 MS

1990 FORD TAURUS INTO RIGID HEAVY TRUCK REAR UNDERRIDE GUARD TEST NO 3

RIGHT REAR SILL Y-AXIS ACCELERATION

TAURUS INTO UNDERRIDE GUARD TEST NUMBER 930603-3

TRC INC



CHANNEL RRSYG1 FILTER CH CLASS 60

PEAK DATA 3 92 G @ 85 63 MS, -1 41 G @ 112 13 MS

1990 FORD TAURUS INTO RIGID HEAVY TRUCK REAR UNDERRIDE GUARD TEST NO 3

RIGHT REAR SILL Y-AXIS VELOCITY

TAURUS INTO UNDERRIDE GUARD

TEST NUMBER 930603-3

TRC INC

60

40

20

0

-20

-40

-60

VELOCITY (MPH)

-20

10

40

70

100

130

160

190

220

250

280

310

TIME (MS)

CHANNEL RRSYV1 FILTER CH CLASS 180

PEAK DATA 1 51 MPH @ 160 50 MS, -0 01 MPH @ 2 13 MS

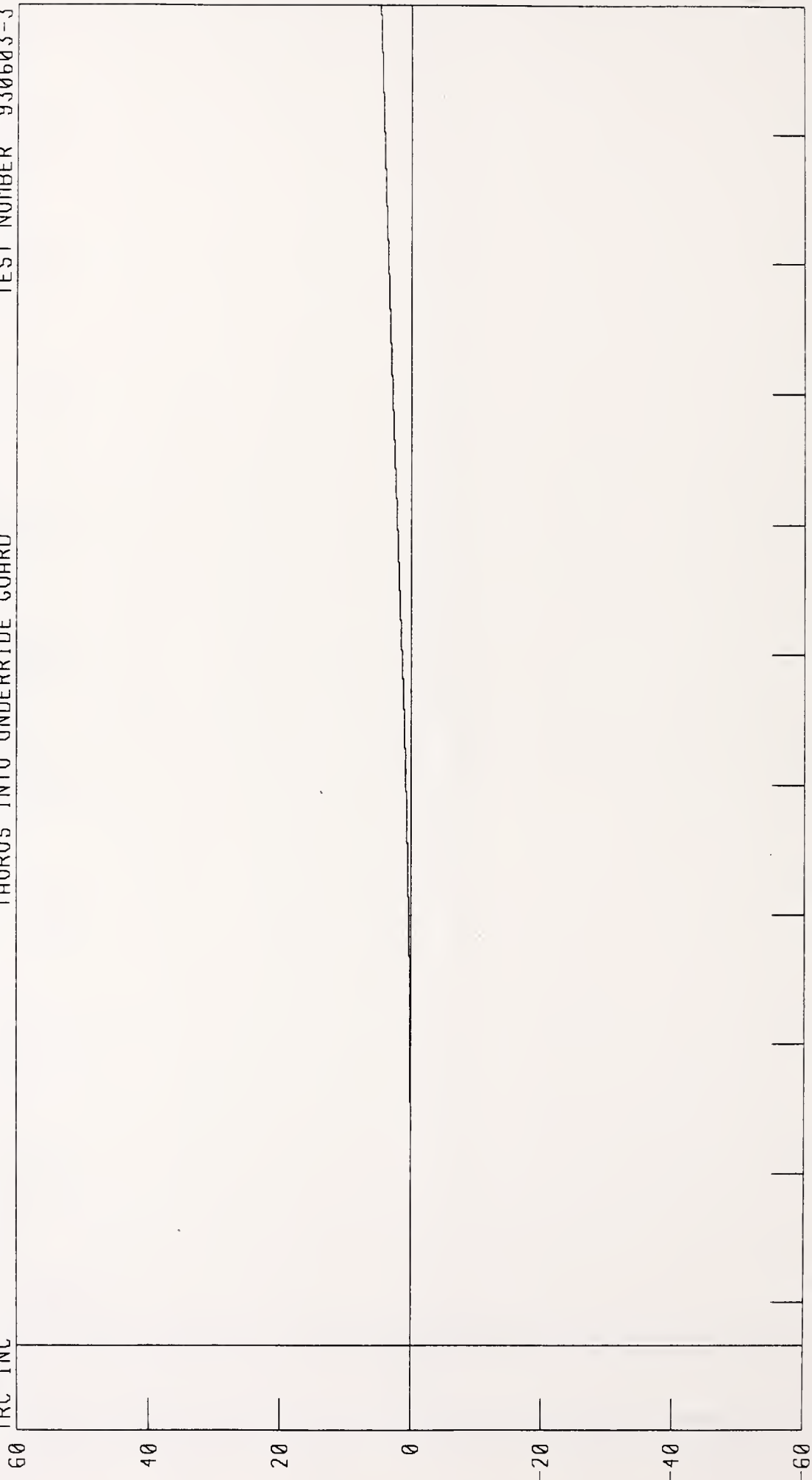


1990 FORD TAURUS INTO RIGID HEAVY TRUCK REAR UNDERRIDE GUARD TEST NO 3

RIGHT REAR SILL Y-AXIS DISPLACEMENT

TAURUS INTO UNDERRIDE GUARD TEST NUMBER 930603-3

TRC INC

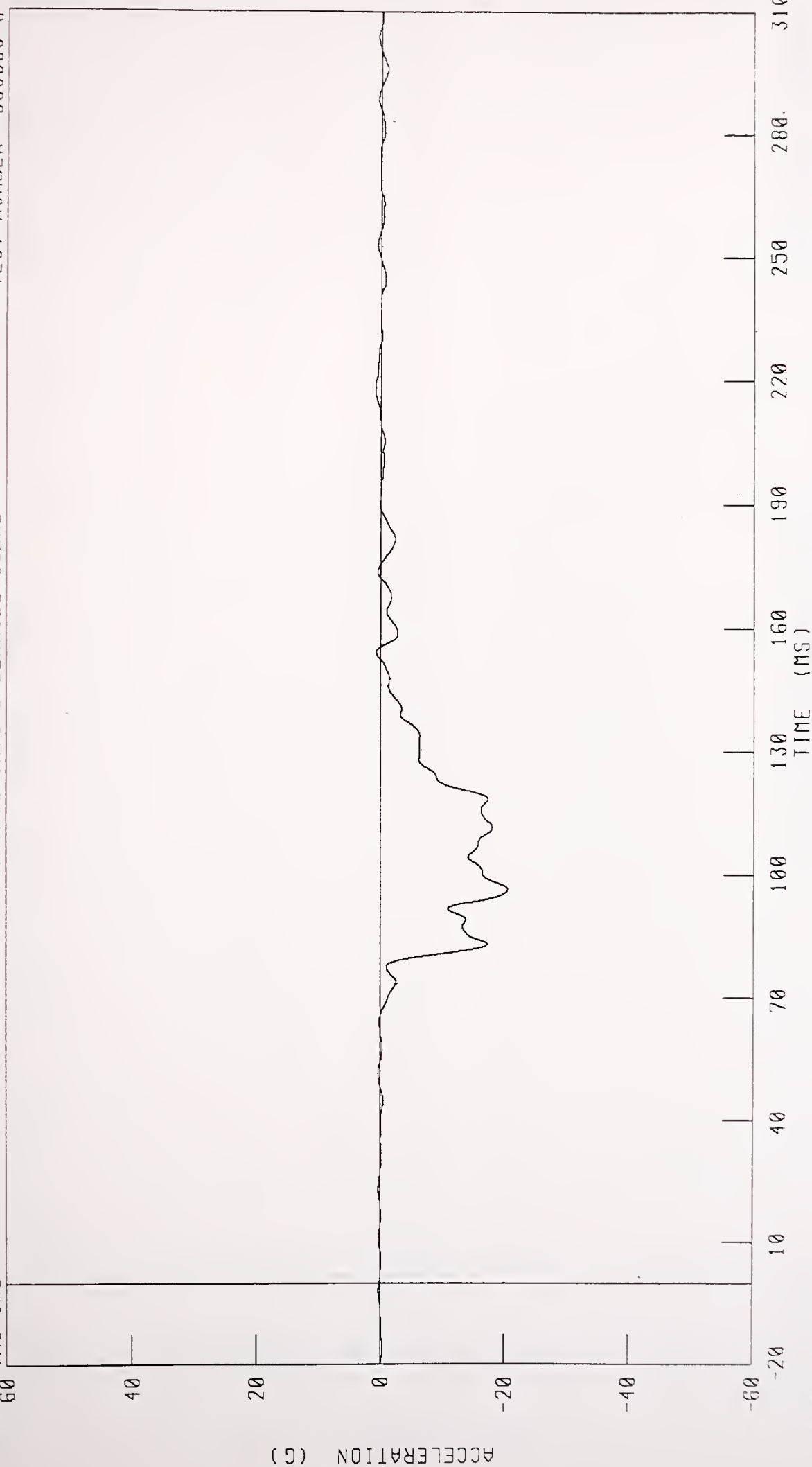


CHANNEL RRSY01 FILTER CH CLASS 180

PEAK DATA 4 71 IN @ 310 00 MS, 0 00 IN @ 3 38 MS

1990 FORD TAURUS INTO RIGID HEAVY TRUCK REAR UNDERRIDE GUARD TEST NO 3  
VEHICLE CENTER OF GRAVITY X-AXIS ACCELERATION

IRC INC  
TAURUS INTO UNDERRIDE GUARD  
TEST NUMBER 930603-3

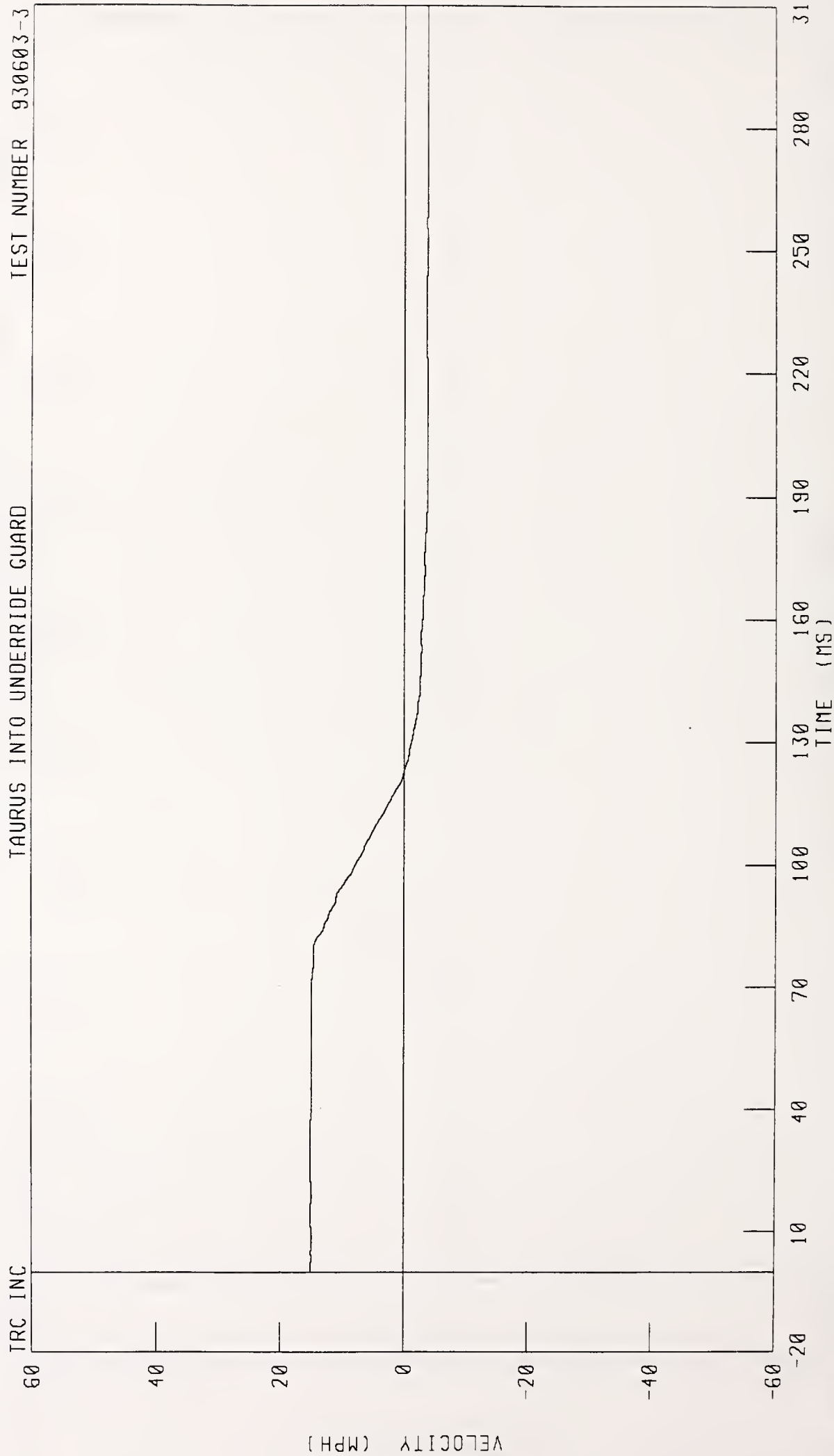


CHANNEL VCGXG1 FILTER CH CLASS 60  
PEAK DATA 0 84 G @ 219 00 MS, -20 50 G @ 96 25 MS

1990 FORD TAURUS INTO RIGID HEAVY TRUCK REAR UNDERRIDE GUARD TEST NO 3

VEHICLE CENTER OF GRAVITY X-AXIS VELOCITY

TAURUS INTO UNDERRIDE GUARD TEST NUMBER 930603-3



CHANNEL VCGXV1 FILTER CH CLASS 180

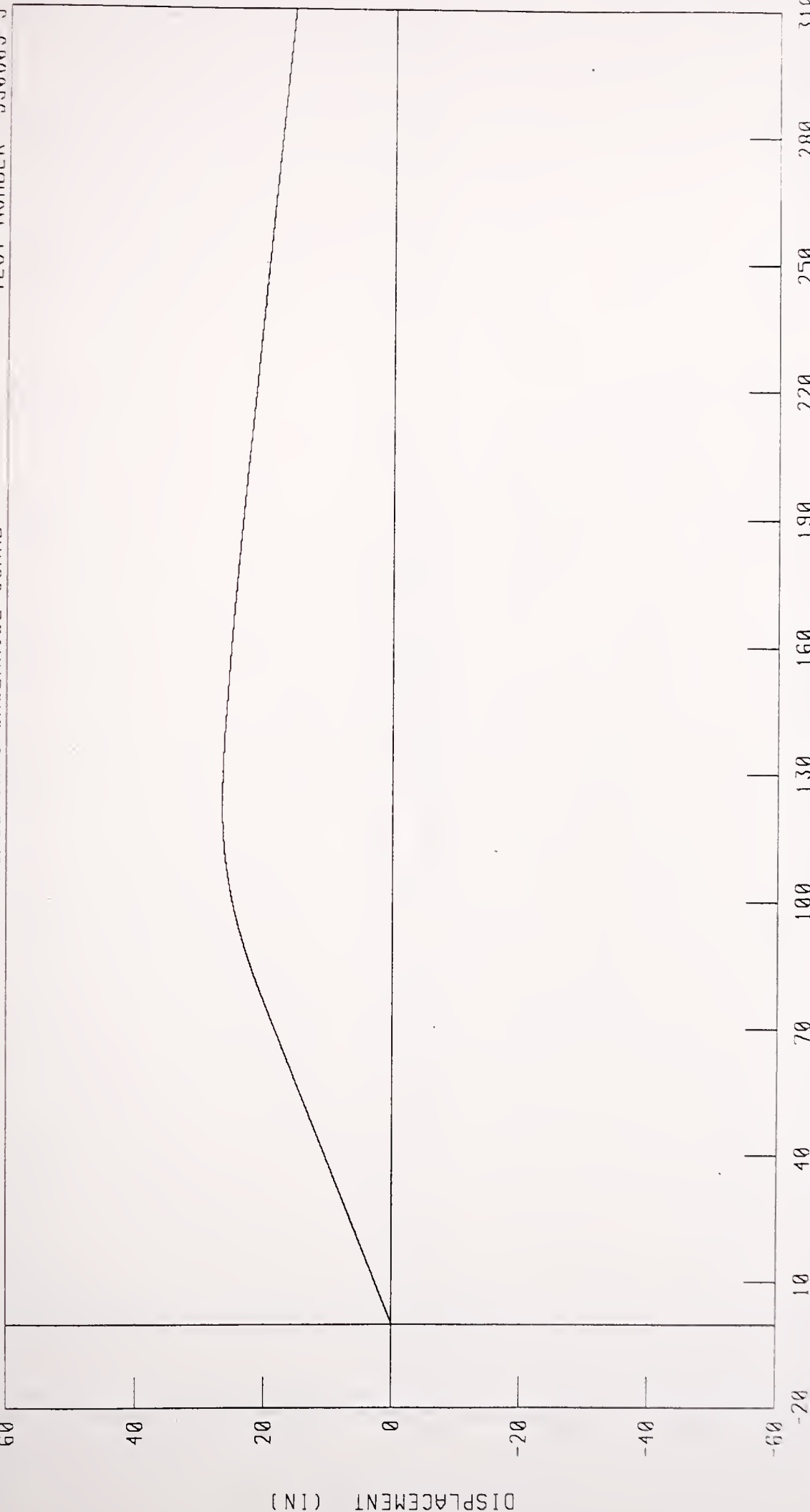
PEAK DATA 15 03 MPH @ 26 38 MS, -3 79 MPH @ 301 25 MS

1990 FORD TAURUS INTO RIGID HEAVY TRUCK REAR UNDERRIDE GUARD TEST NO 3

VEHICLE CENTER OF GRAVITY X-AXIS DISPLACEMENT

TAURUS INTO UNDERRIDE GUARD TEST NUMBER 930603-3

TRC INC



TIME (MS)

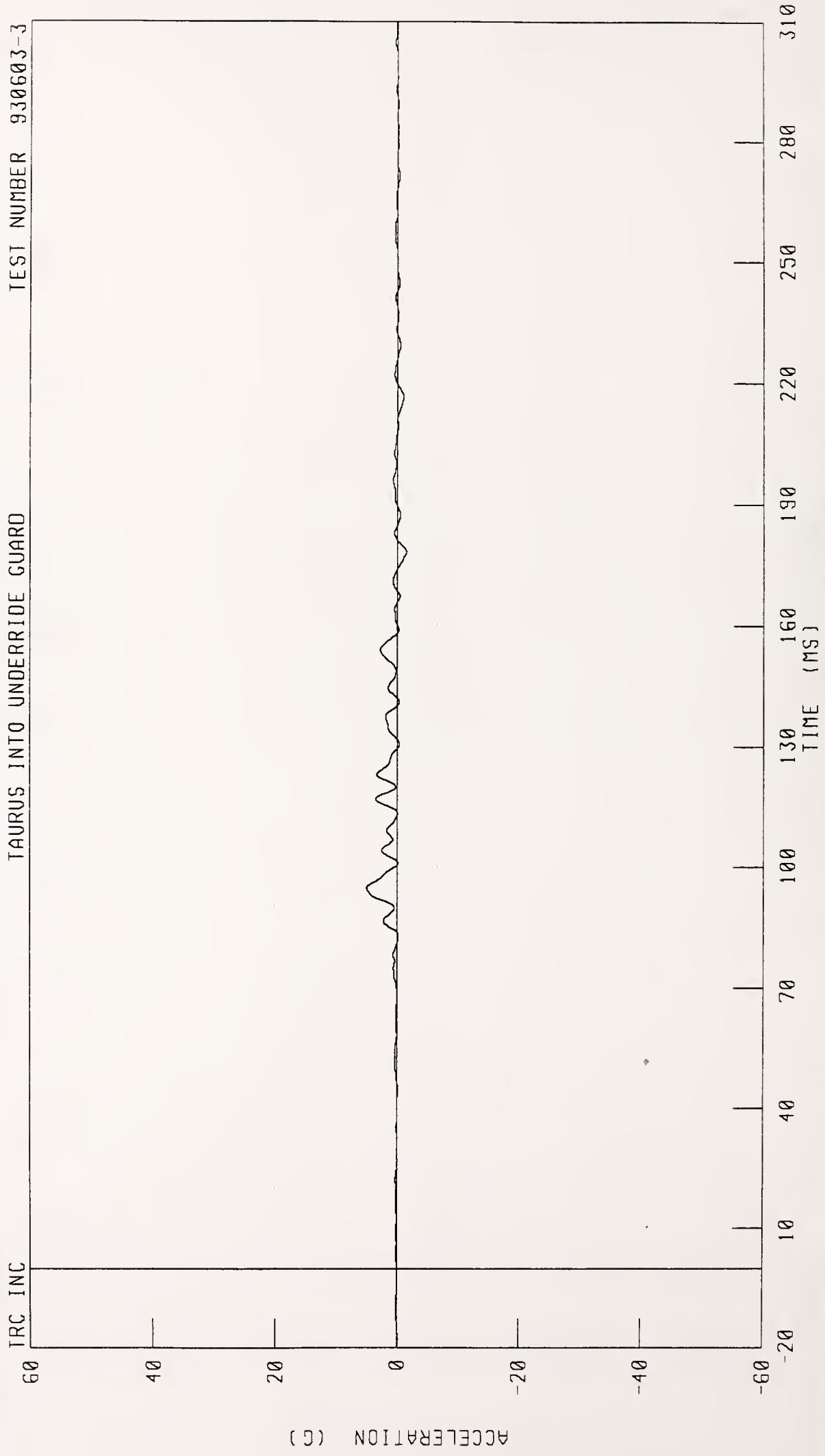
CHANNEL VCCXD1 FILTER CH CLASS 180

PEAK DATA 26 55 IN @ 122 88 MS, 0 00 IN @ 0 00 MS



1990 FORD TAURUS INTO RIGID HEAVY TRUCK REAR UNDERRIDE GUARD TEST NO 3  
 VEHICLE CENTER OF GRAVITY Y-AXIS ACCELERATION

TAURUS INTO UNDERRIDE GUARD TEST NUMBER 930603-3

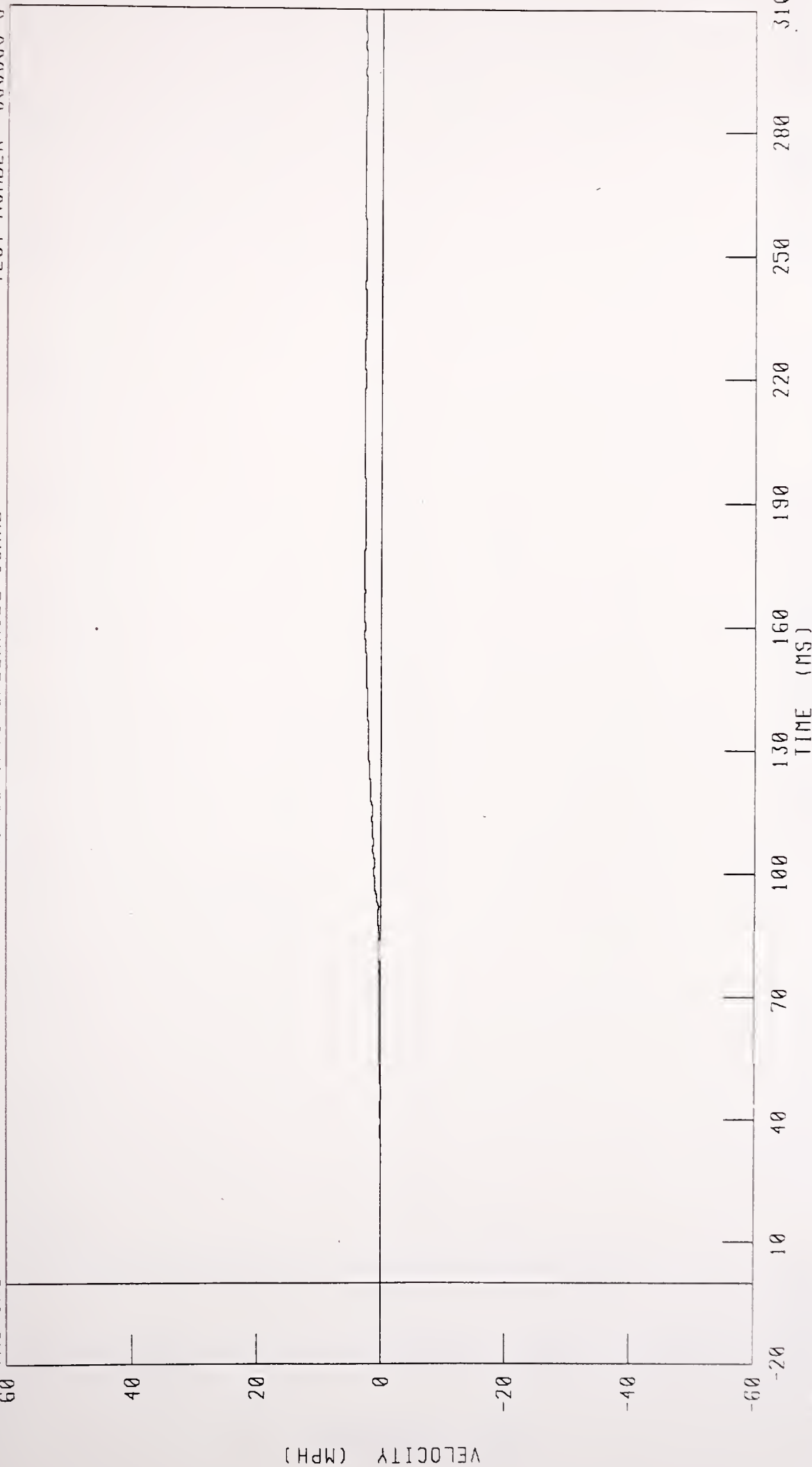


CHANNEL VCCYG1 FILTER CH CLASS 60

PEAK DATA 5 02 G @ 94 75 MS, -1 48 G @ 178 13 MS

1990 FORD TAURUS INTO RIGID HEAVY TRUCK REAR UNDERRIDE GUARD TEST NO 3  
VEHICLE CENTER OF GRAVITY Y-AXIS VELOCITY

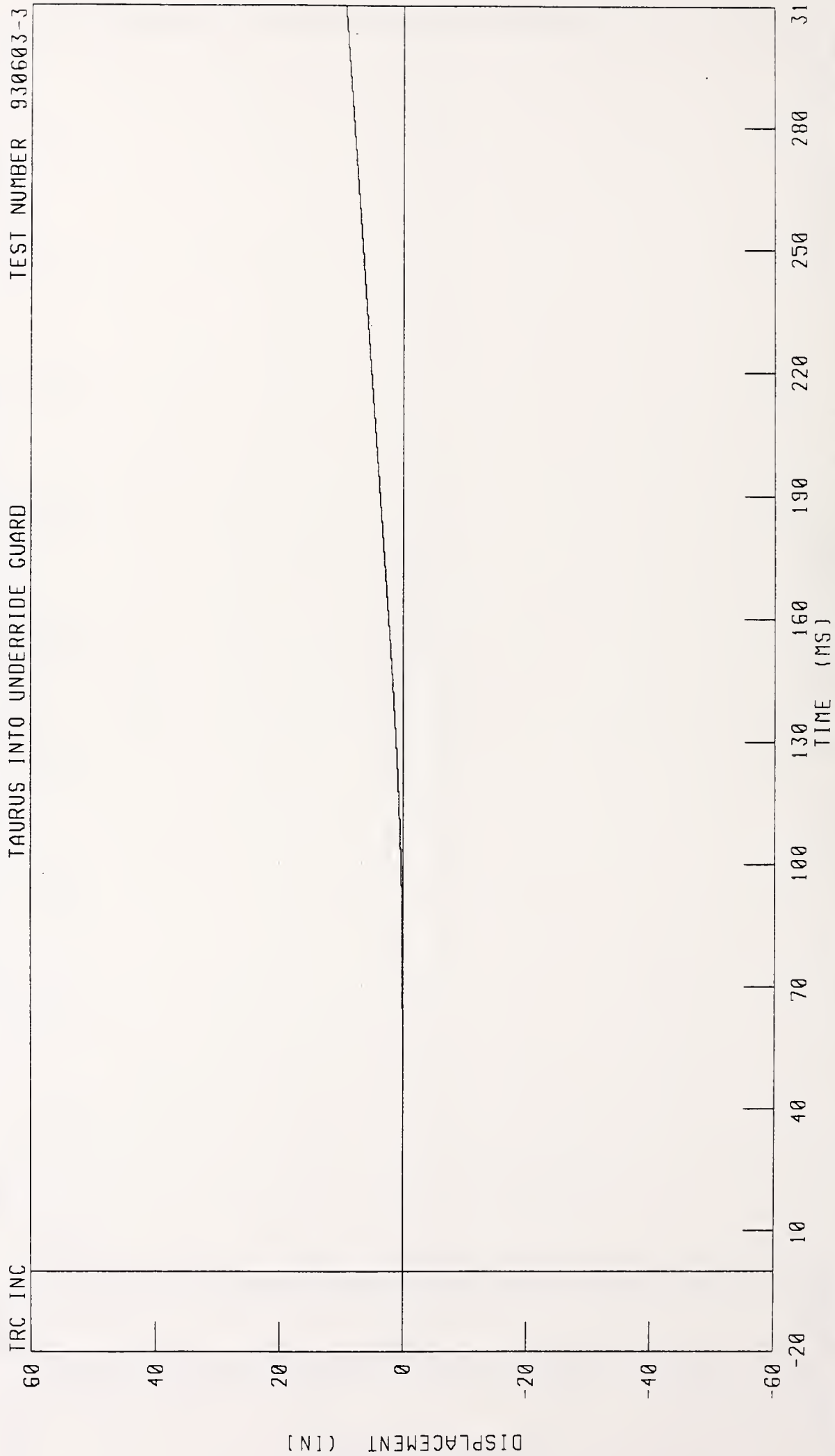
TRC INC Taurus into Underride Guard TEST NUMBER 930603-3



CHANNEL VCGYV1 FILTER CH CLASS 180 PEAK DATA 2 74 MPH @ 207 63 MS, 0 00 MPH @ 2 00 MS

1990 FORD TAURUS INTO RIGID HEAVY TRUCK REAR UNDERRIDE GUARD TEST NO 3  
 VEHICLE CENTER OF GRAVITY Y-AXIS DISPLACEMENT

TAURUS INTO UNDERRIDE GUARD TEST NUMBER 930603-3

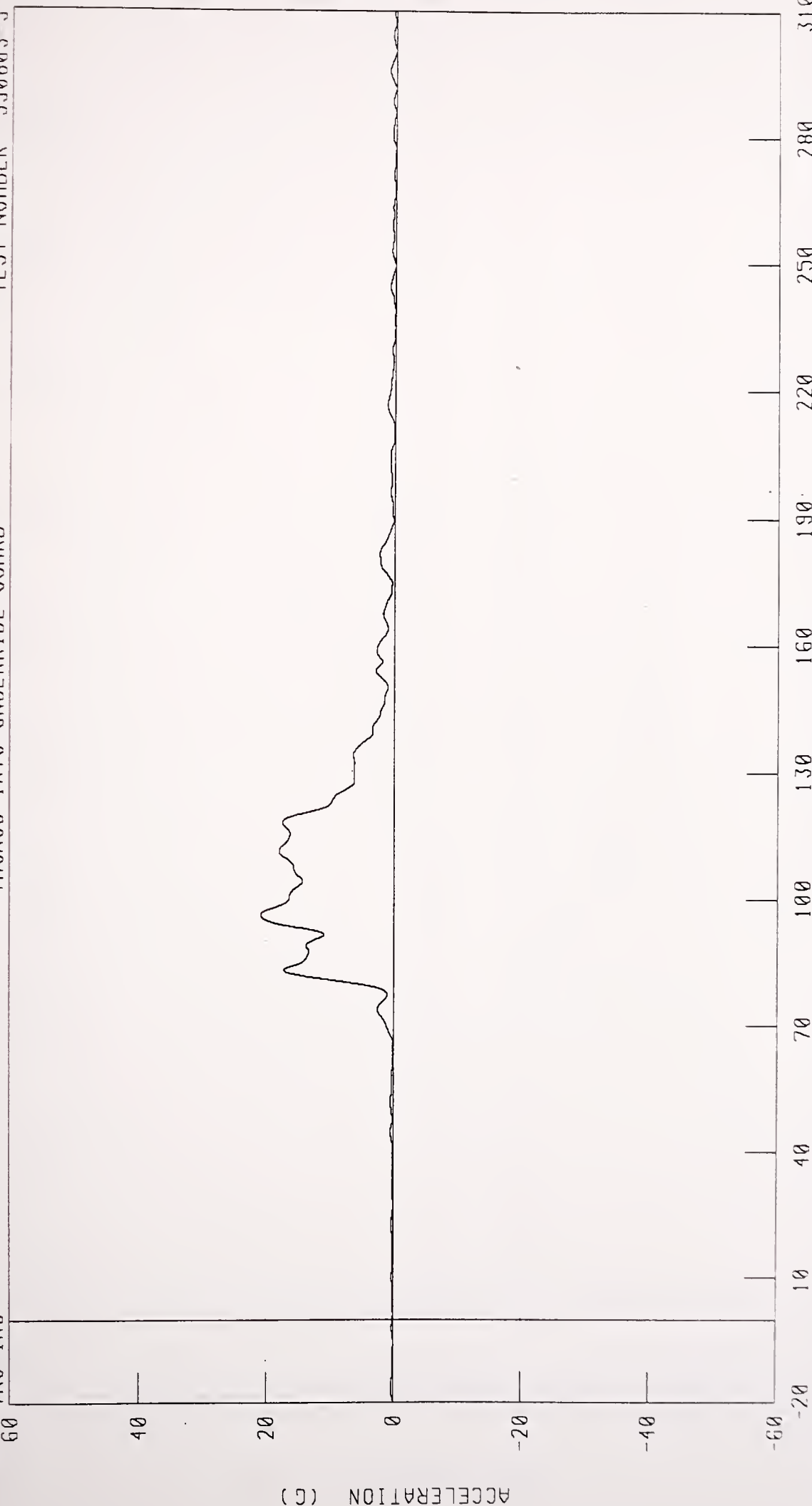


CHANNEL VCGYD1 FILTER CH CLASS 180 PEAK DATA 9 37 IN @ 310 00 MS, 0 00 IN @ 0 00 MS

1990 FORD TAURUS INTO RIGID HEAVY TRUCK REAR UNDERRIDE GUARD TEST NO 3  
 VEHICLE CENTER OF GRAVITY RESULTANT ACCELERATION

TAURUS INTO UNDERRIDE GUARD TEST NUMBER 930603-3

IRC INC



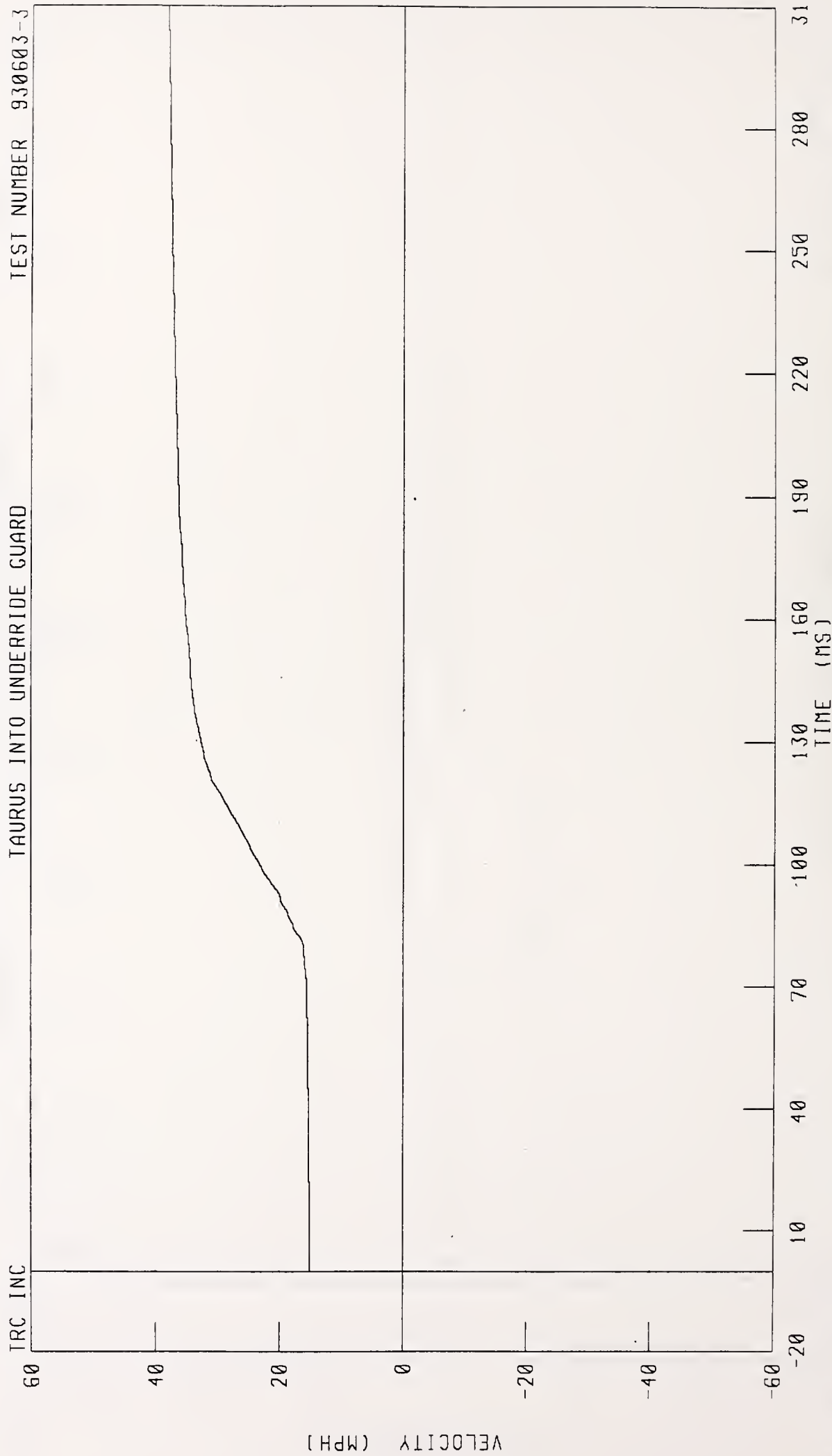
CHANNEL VCCRG1 FILTER CH CLASS 60

TIME (MS)

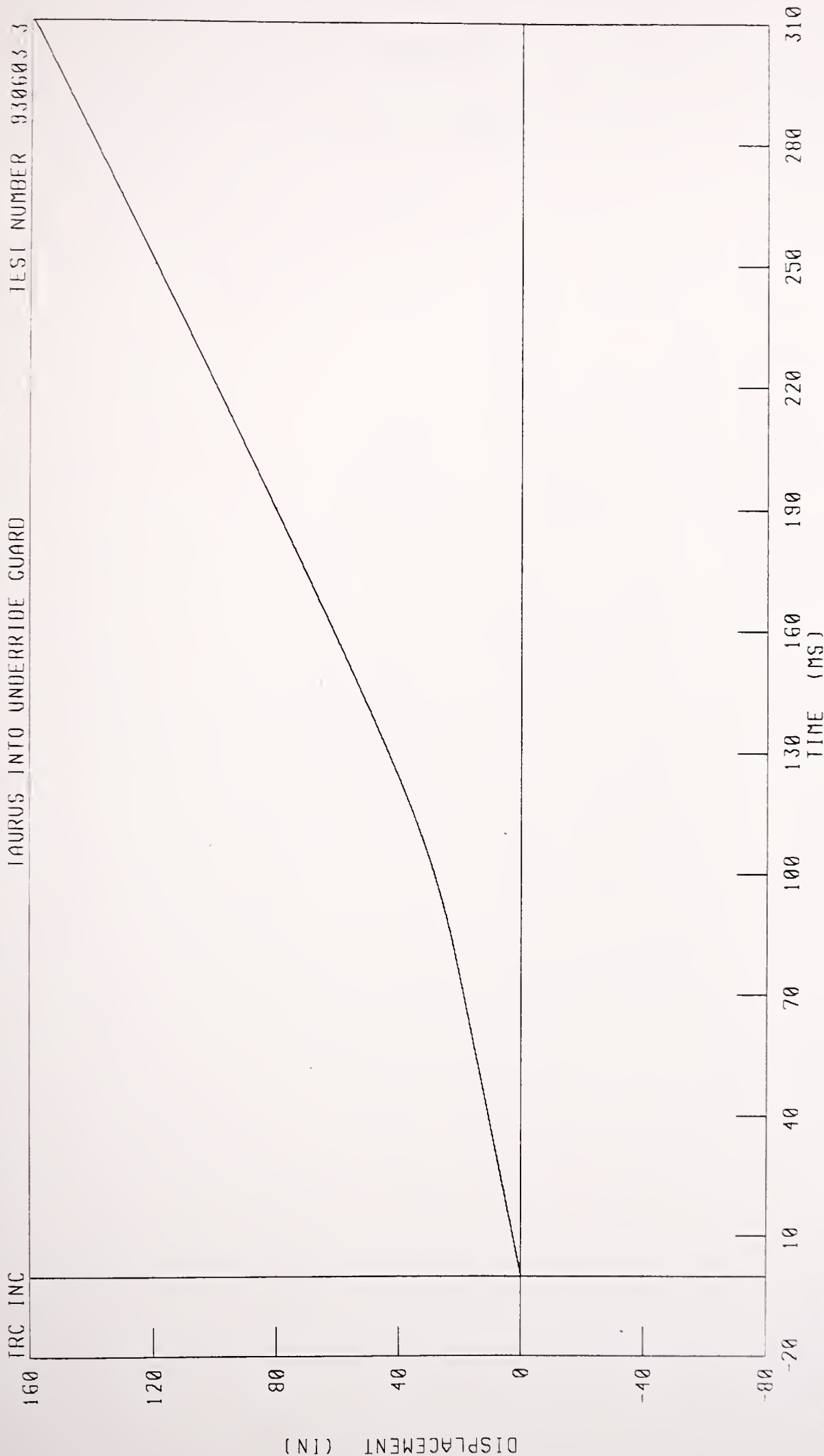
PEAK DATA 20 84 G @ 96 13 MS, 0 00 G @ 285 88 MS



1990 FORD TAURUS INTO RIGID HEAVY TRUCK REAR UNDERRIDE GUARD TEST NO 3  
 VEHICLE CENTER OF GRAVITY RESULTANT VELOCITY



1990 FORD TAURUS INTO RIGID HEAVY TRUCK REAR UNDERRIDE GUARD TEST NO 3  
 VEHICLE CENTER OF GRAVITY RESULTANT DISPLACEMENT



TEST NUMBER 930603 3

TAURUS INTO UNDERRIDE GUARD

CHANNEL VCCR01 FILTER CH CLASS 180 PEAK DATA 159 16 IN @ 310 00 MS, 0 00 IN @ 0 00 MS



DATA PLOTS

TEST NO. 930603-4



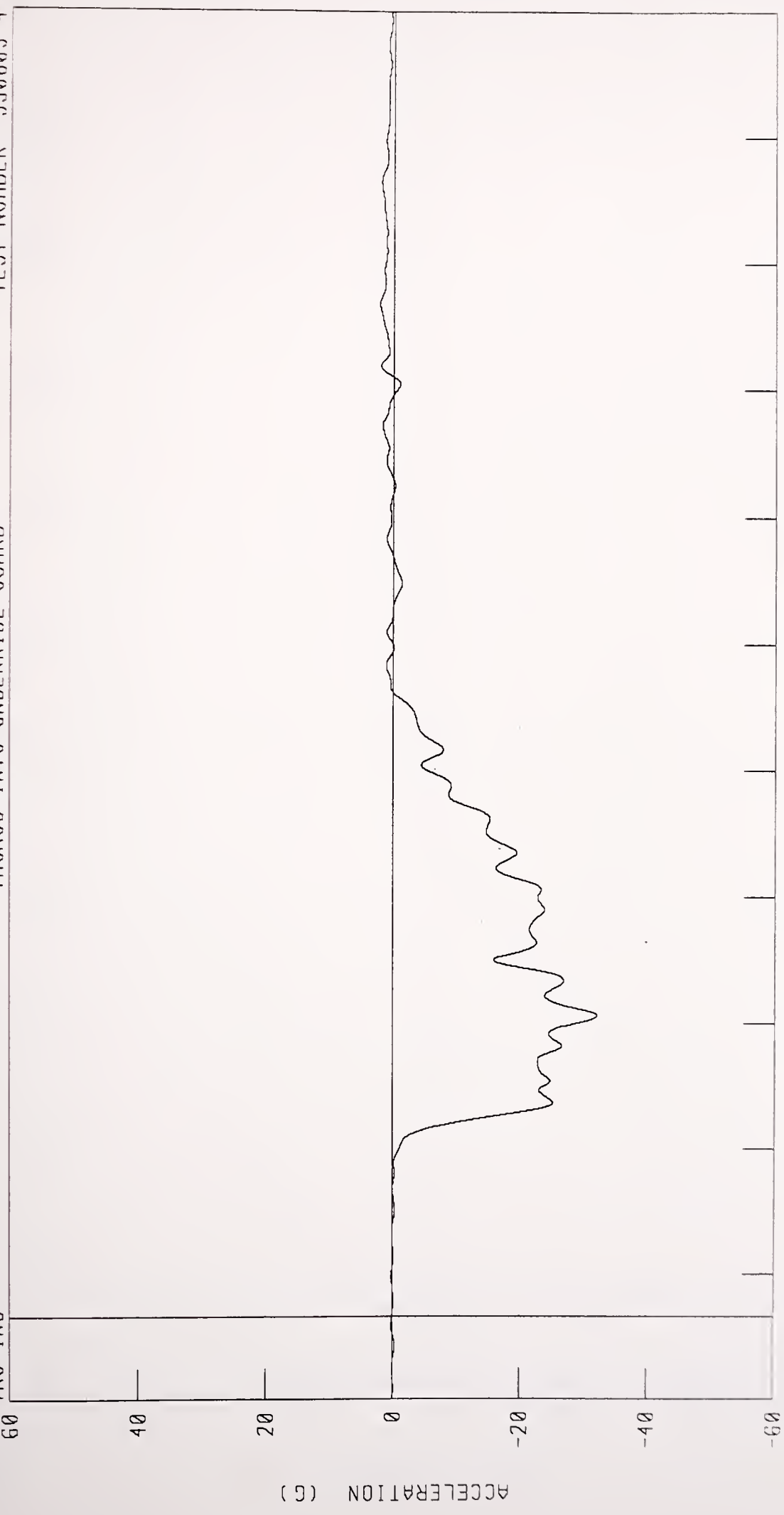


1990 FORD TAURUS INTO RIGID HEAVY TRUCK REAR UNDERRIDE GUARD TEST NO 4

LEFT REAR SILL X-AXIS ACCELERATION

TAURUS INTO UNDERRIDE GUARD TEST NUMBER 930603-4

TRC INC



CHANNEL LRSXG1 FILTER CH CLASS 60

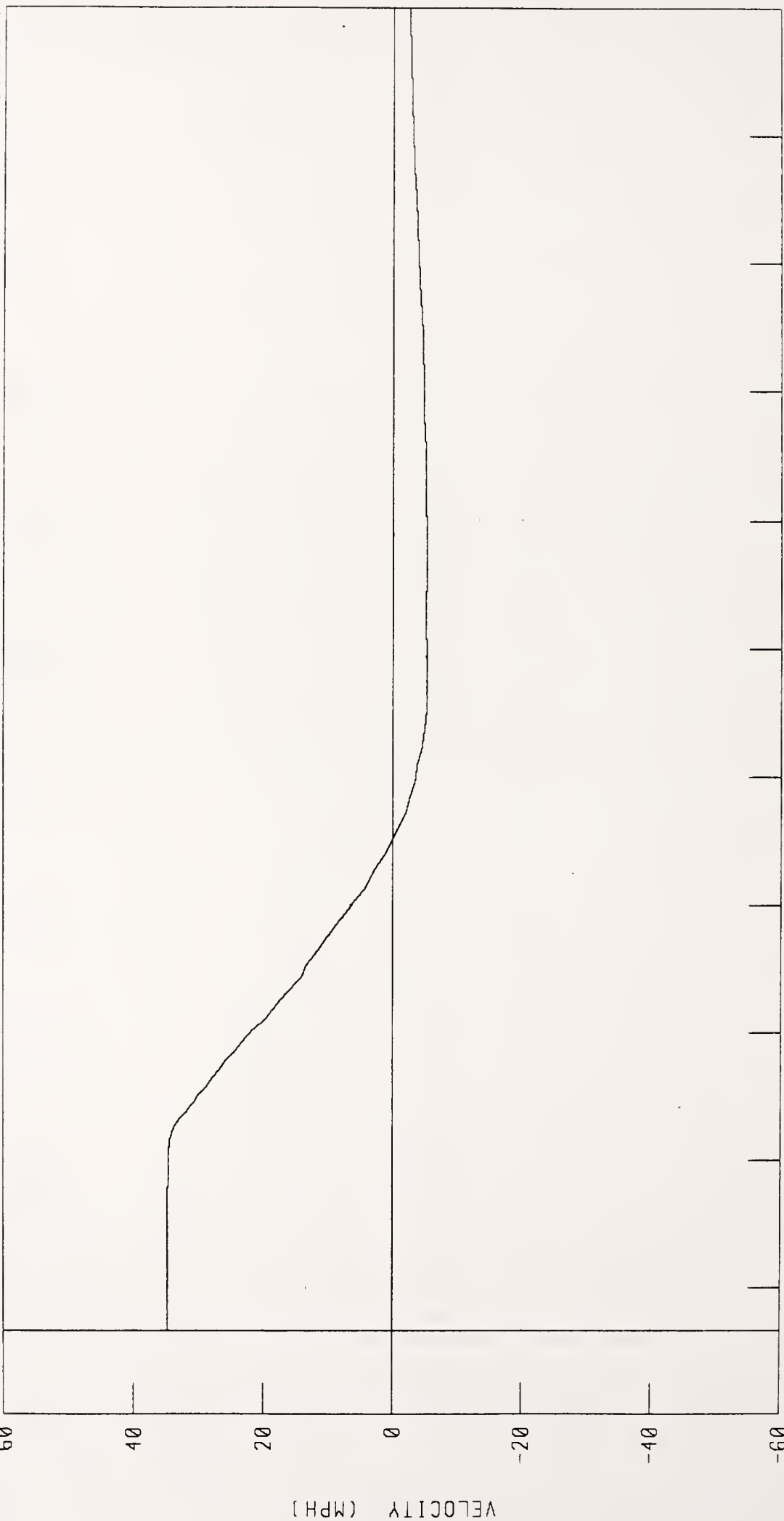
PEAK DATA 2 18 G @ 240 38 MS, -32 20 G @ 71 75 MS

1990 FORD TAURUS INTO RIGID HEAVY TRUCK REAR UNDERRIDE GUARD TEST NO 4

LEFT REAR SILL X-AXIS VELOCITY

TAURUS INTO UNDERRIDE GUARD TEST NUMBER 930603-4

TRC INC

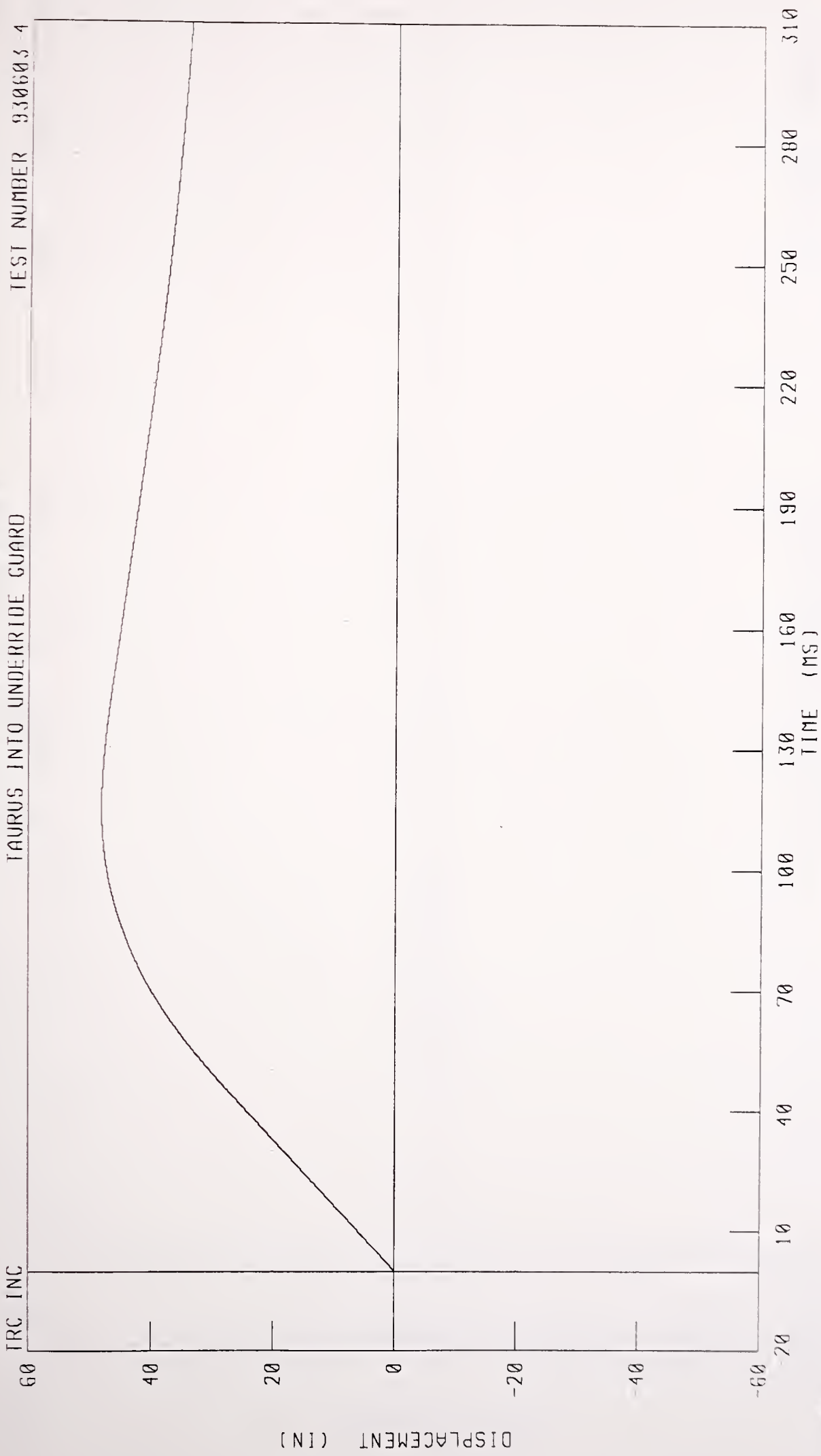


CHANNEL LRSXV1 FILTER CH CLASS 180

PEAK DATA 34 70 MPH @ 10 38 MS, -5 31 MPH @ 147 50 MS

1990 FORD TAURUS INTO RIGID HEAVY TRUCK REAR UNDERRIDE GUARD TEST NO 4  
 LEFT REAR SILL X-AXIS DISPLACEMENT

TAURUS INTO UNDERRIDE GUARD TEST NUMBER 930603-4

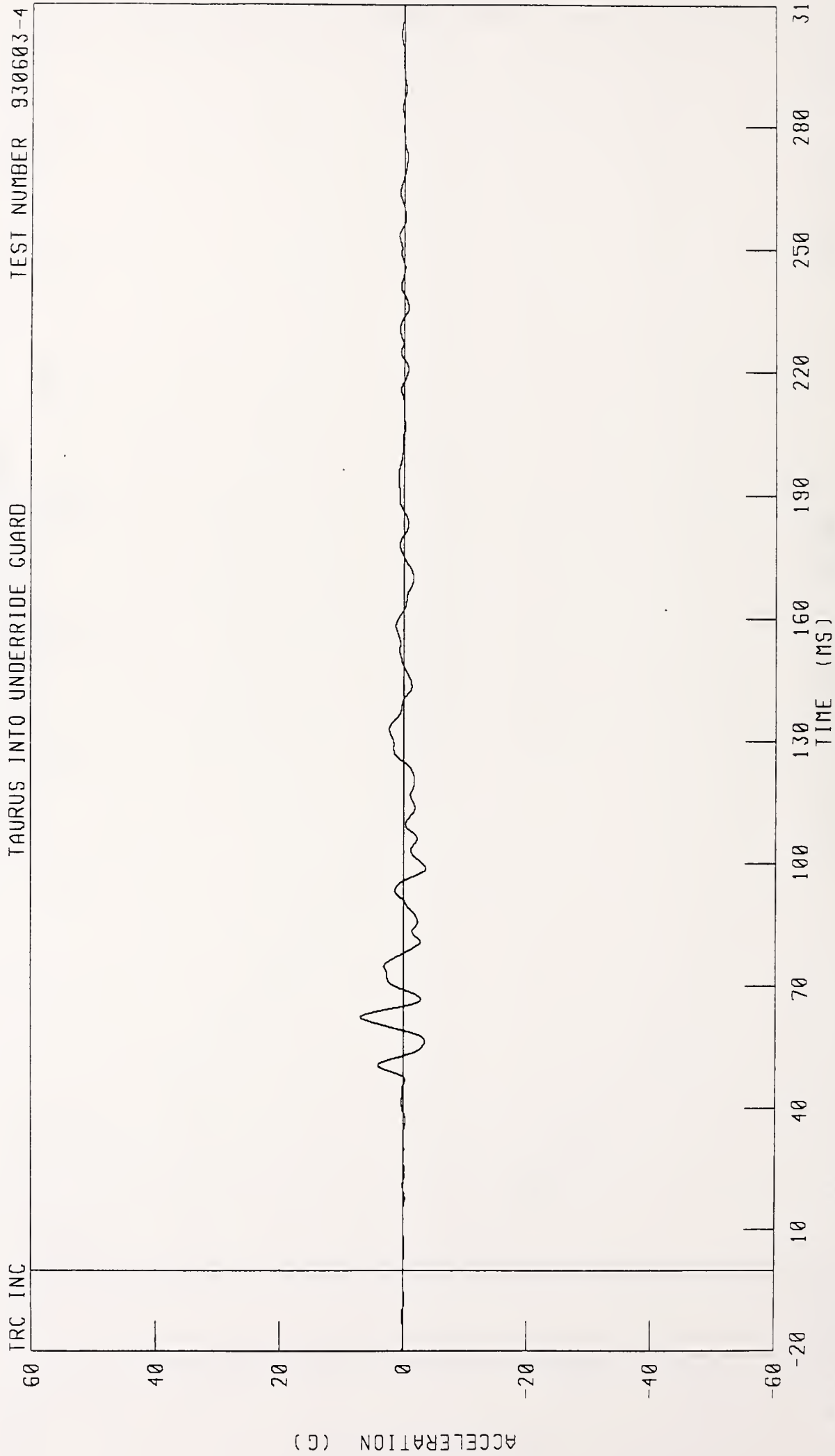


CHANNEL LRSX01 FILTER CH CLASS 180 PEAK DATA 48 08 IN @ 115 50 MS, 0 00 IN @ 0 00 MS

1990 FORD TAURUS INTO RIGID HEAVY TRUCK REAR UNDERRIDE GUARD TEST NO 4

LEFT REAR SILL Y-AXIS ACCELERATION

TAURUS INTO UNDERRIDE GUARD TEST NUMBER 930603-4



CHANNEL LRSYG1 FILTER CH CLASS 60

PEAK DATA 6 94 G @ 62 25 MS, -3 59 G @ 98 63 MS



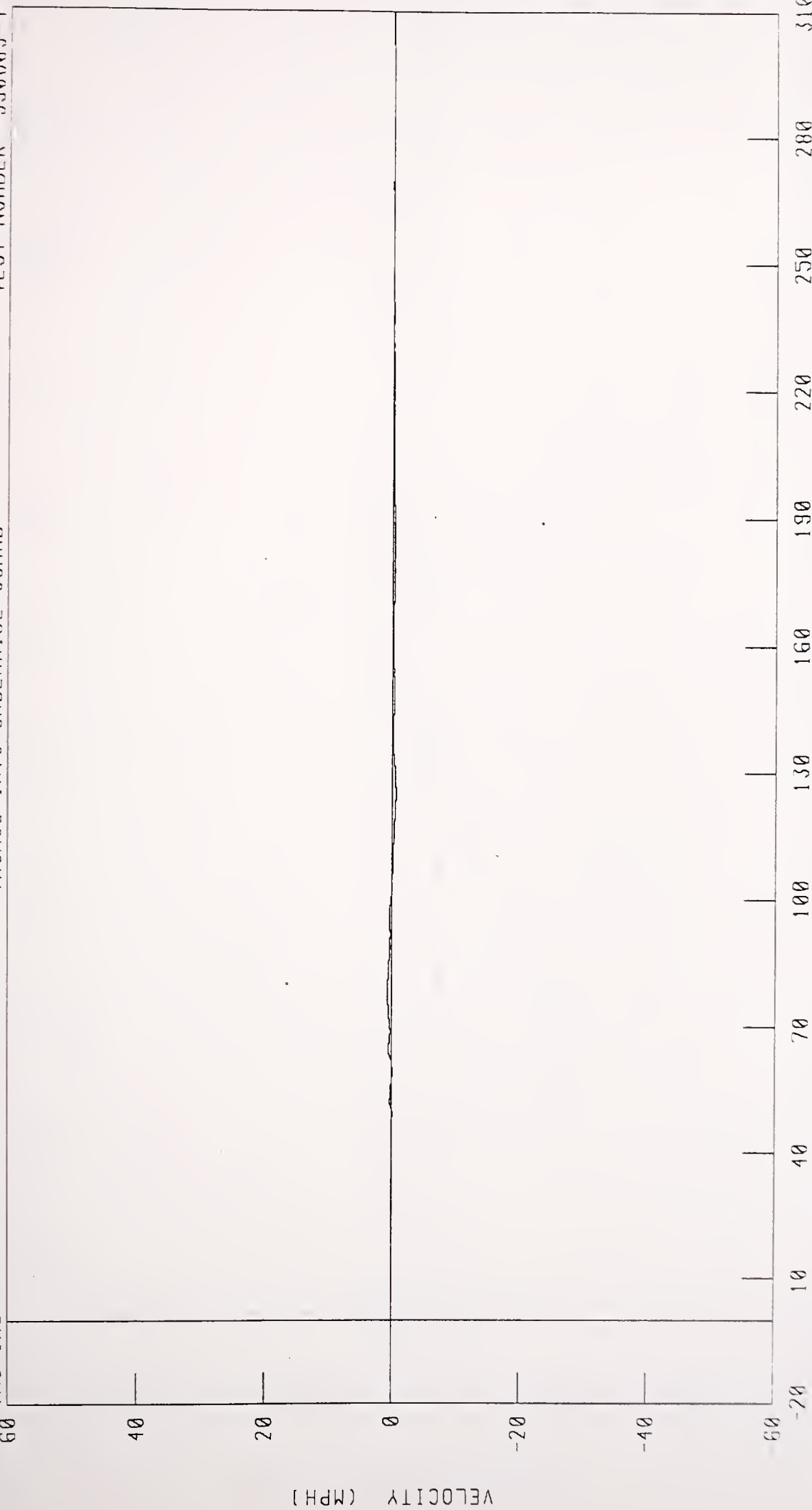
1990 FORD TAURUS INTO RIGID HEAVY TRUCK REAR UNDERRIDE GUARD TEST NO 4

LEFT REAR SILL Y-AXIS VELOCITY

TAURUS INTO UNDERRIDE GUARD

TEST NUMBER 930603-4

TRC INC



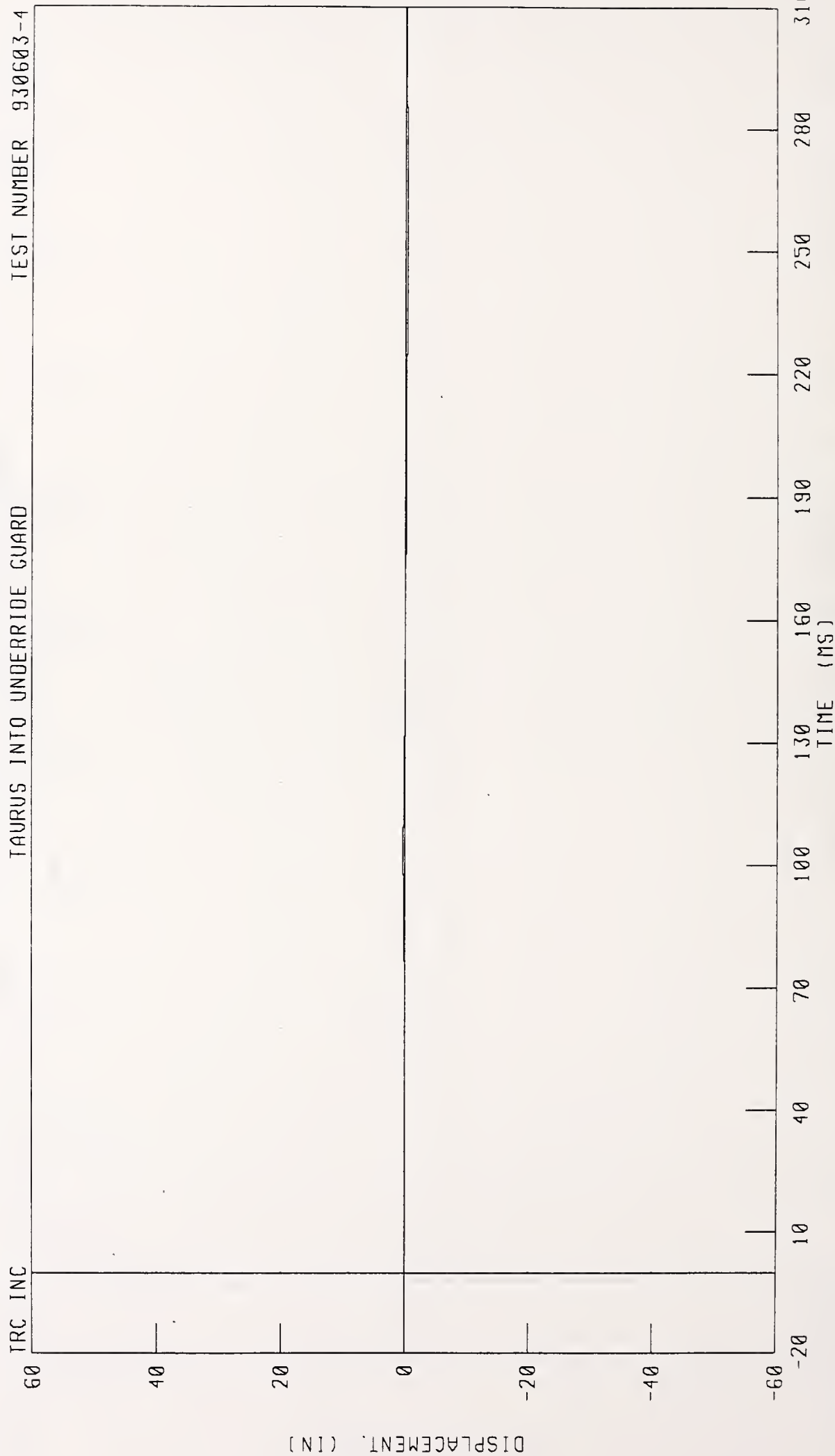
CHANNEL 1 PSYV1 FILTER CH CLASS 180

PEAK DATA 0 73 MPH @ 78 75 MS, -0 63 MPH @ 125 00 MS

1990 FORD TAURUS INTO RIGID HEAVY TRUCK REAR UNDERRIDE GUARD TEST NO 4

LEFT REAR SILL Y-AXIS DISPLACEMENT

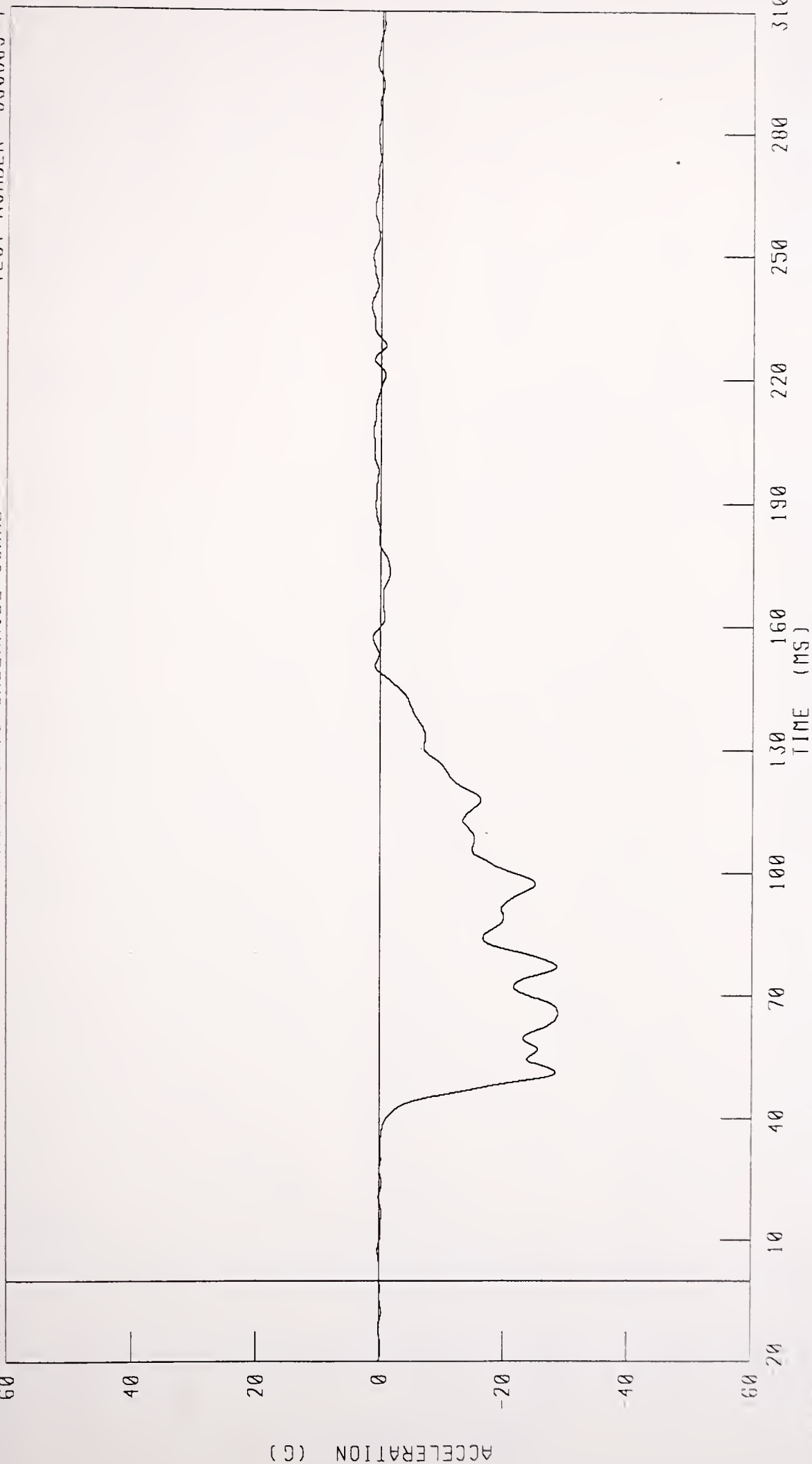
TAURUS INTO UNDERRIDE GUARD TEST NUMBER 930603-4



CHANNEL LRSYD1 FILTER CH CLASS 180 PEAK DATA 0 28 IN @ 104 75 MS, -0 28 IN @ 253 13 MS

1990 FORD TAURUS INTO RIGID HEAVY TRUCK REAR UNDERRIDE GUARD TEST NO 4  
RIGHT REAR SILL X-AXIS ACCELERATION

IRC INC  
TAURUS INTO UNDERRIDE GUARD  
TEST NUMBER 930603-4



CHANNEL RRSXG1 FILTER CH CLASS 60  
PEAK DATA 1 58 G @ 237 88 MS, -28 72 G @ 65 38 MS

1990 FORD TAURUS INTO RIGID HEAVY TRUCK REAR UNDERRIDE GUARD TEST NO 4

RIGHT REAR SILL X-AXIS VELOCITY

TAURUS INTO UNDERRIDE GUARD

TEST NUMBER 930603-4

TRC INC



TIME (MS)

CHANNEL RRSXV1 FILTER CH CLASS 180

PEAK DATA 34 73 MPH @ 9 75 MS, -4 96 MPH @ 178 38 MS

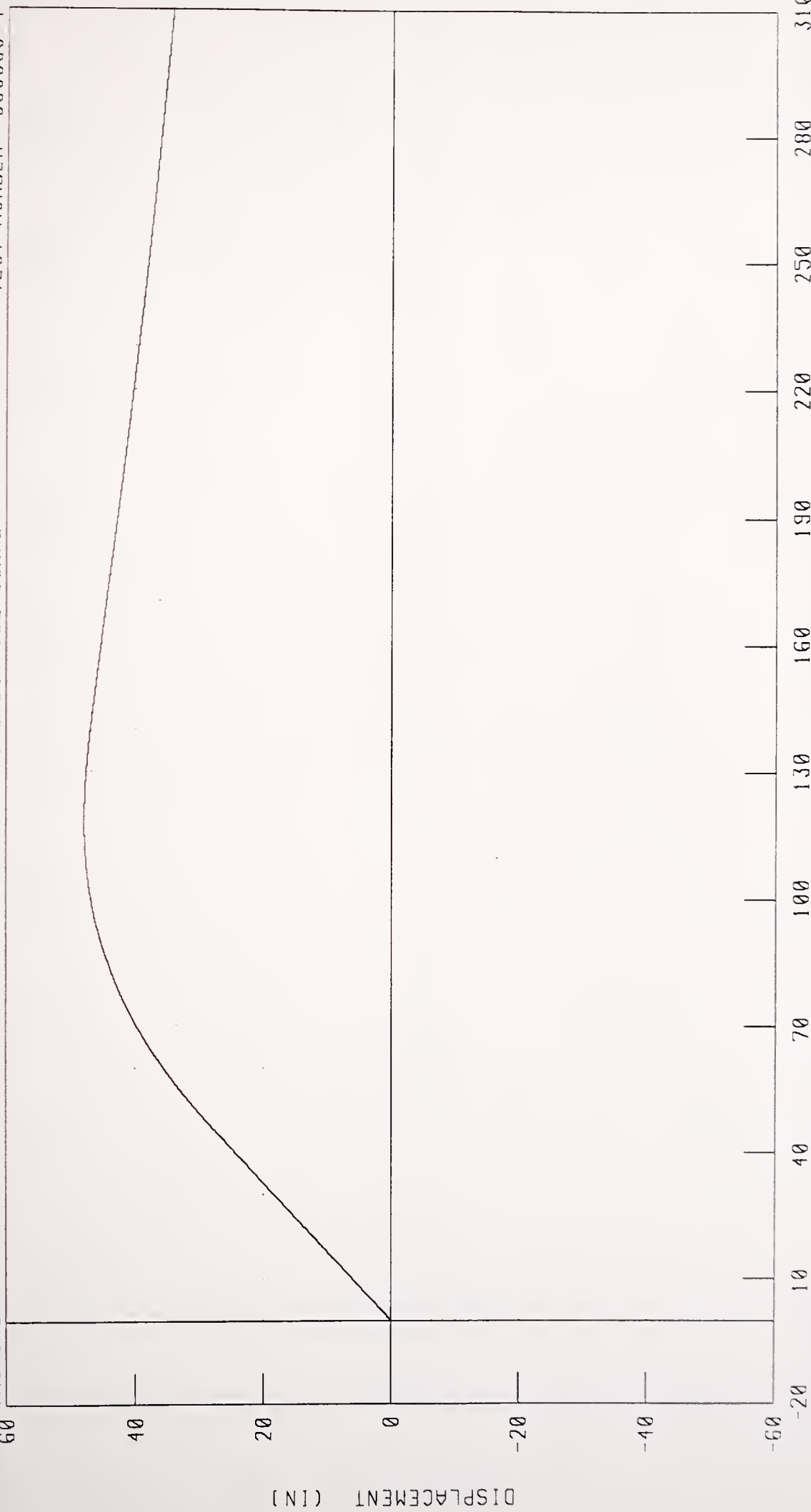
1990 FORD TAURUS INTO RIGID HEAVY TRUCK REAR UNDERRIDE GUARD TEST NO 4

RIGHT REAR SILL X-AXIS DISPLACEMENT

TEST NUMBER 930603 4

TAURUS INTO UNDERRIDE GUARD

IRC INC



TIME (MS)

CHANNEL BRSXD1 FILTER CH CLASS 180

PEAK DATA 47 89 IN @ 118 63 MS, 0 00 IN @ 0 00 MS



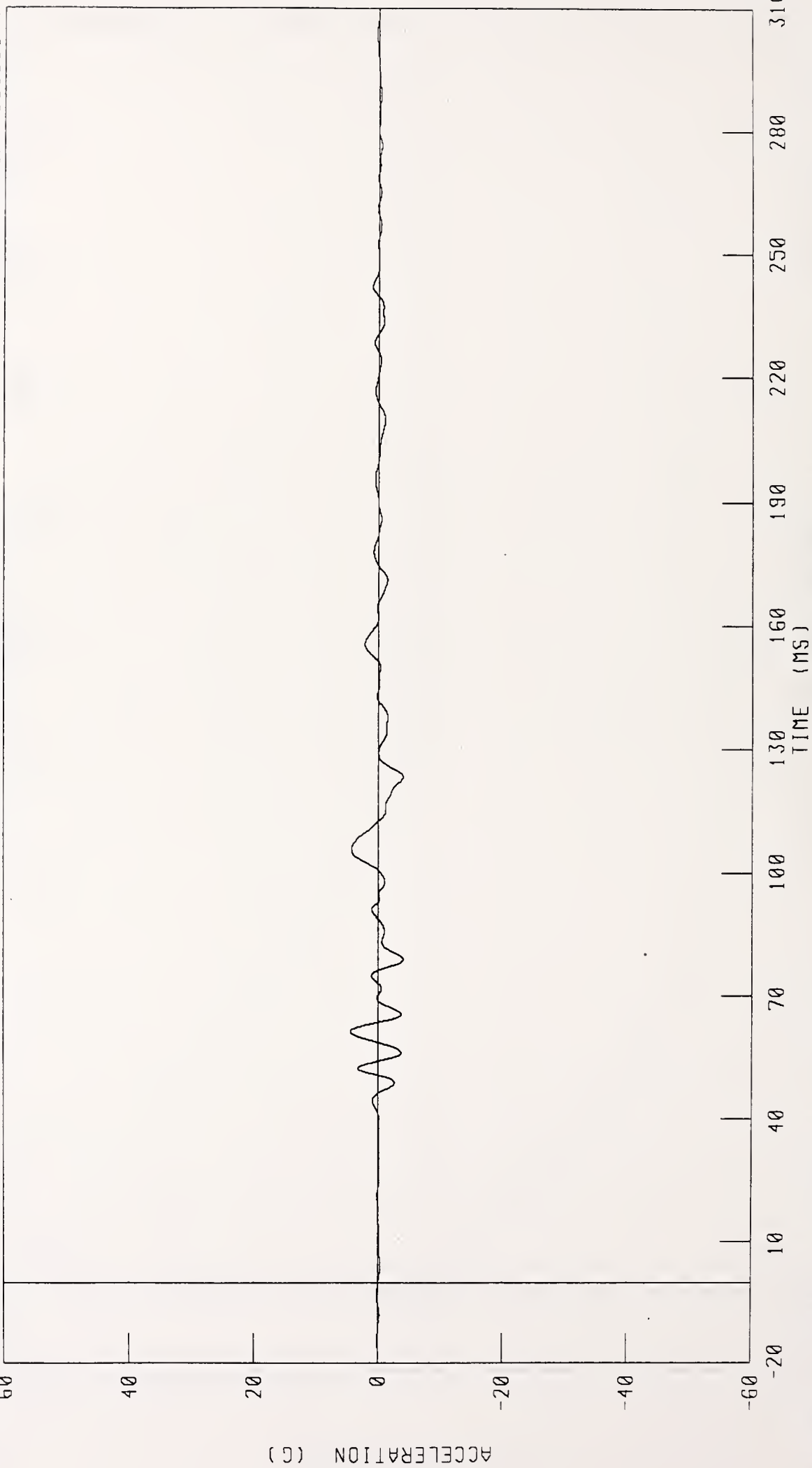
1990 FORD TAURUS INTO RIGID HEAVY TRUCK REAR UNDERRIDE GUARD TEST NO 4

RIGHT REAR SILL Y-AXIS ACCELERATION

TAURUS INTO UNDERRIDE GUARD

TEST NUMBER 930603-4

IRC INC



CHANNEL RRSYG1 FILTER CH CLASS 60

PEAK DATA 4 47 G @ 61 13 MS, -4 01 G @ 78 88 MS

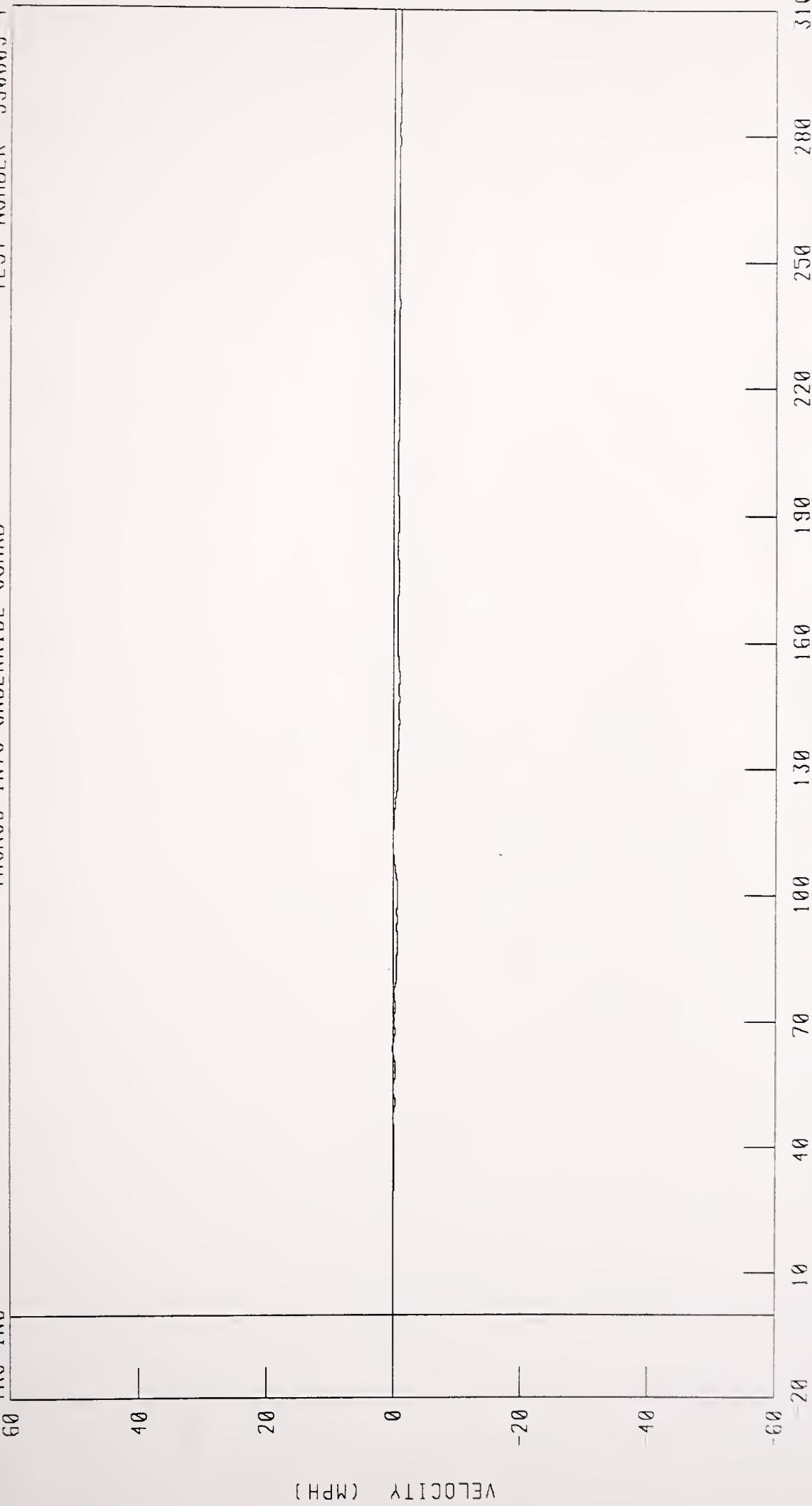
1990 FORD TAURUS INTO RIGID HEAVY TRUCK REAR UNDERRIDE GUARD TEST NO 4

RIGHT REAR SILL Y-AXIS VELOCITY

TAURUS INTO UNDERRIDE GUARD

TEST NUMBER 930603-4

IRC INC



CHANNEL RRSYV1 FILTER CH CLASS 180 PEAK DATA 0 13 MPH @ 63 63 MS, -0 98 MPH @ 295 38 MS

1990 FORD TAURUS INTO RIGID HEAVY TRUCK REAR UNDERRIDE GUARD TEST NO 4

RIGHT REAR SILL Y-AXIS DISPLACEMENT

TAURUS INTO UNDERRIDE GUARD TEST NUMBER 930603-4

TRC INC



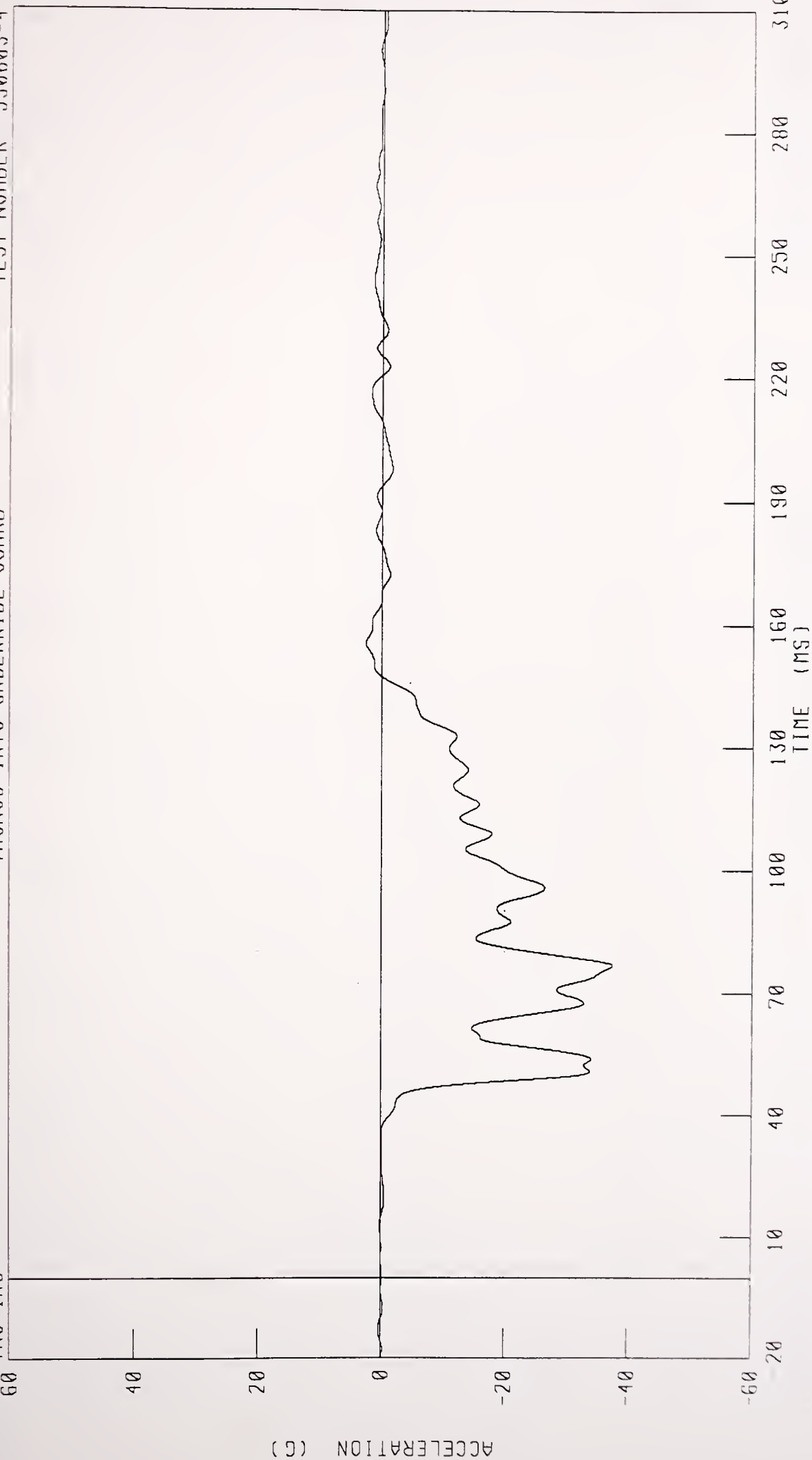
CHANNEL RRSY01 FILTER CH CLASS 180

PEAK DATA 0 00 IN @ 1 25 MS, -3 18 IN @ 310 00 MS

1990 FORD TAURUS INTO RIGID HEAVY TRUCK REAR UNDERRIDE GUARD TEST NO 4  
VEHICLE CENTER OF GRAVITY X-AXIS ACCELERATION

TAURUS INTO UNDERRIDE GUARD TEST NUMBER 930603-4

TRC INC



CHANNEL VCCXG1 FILTER CH CLASS 60

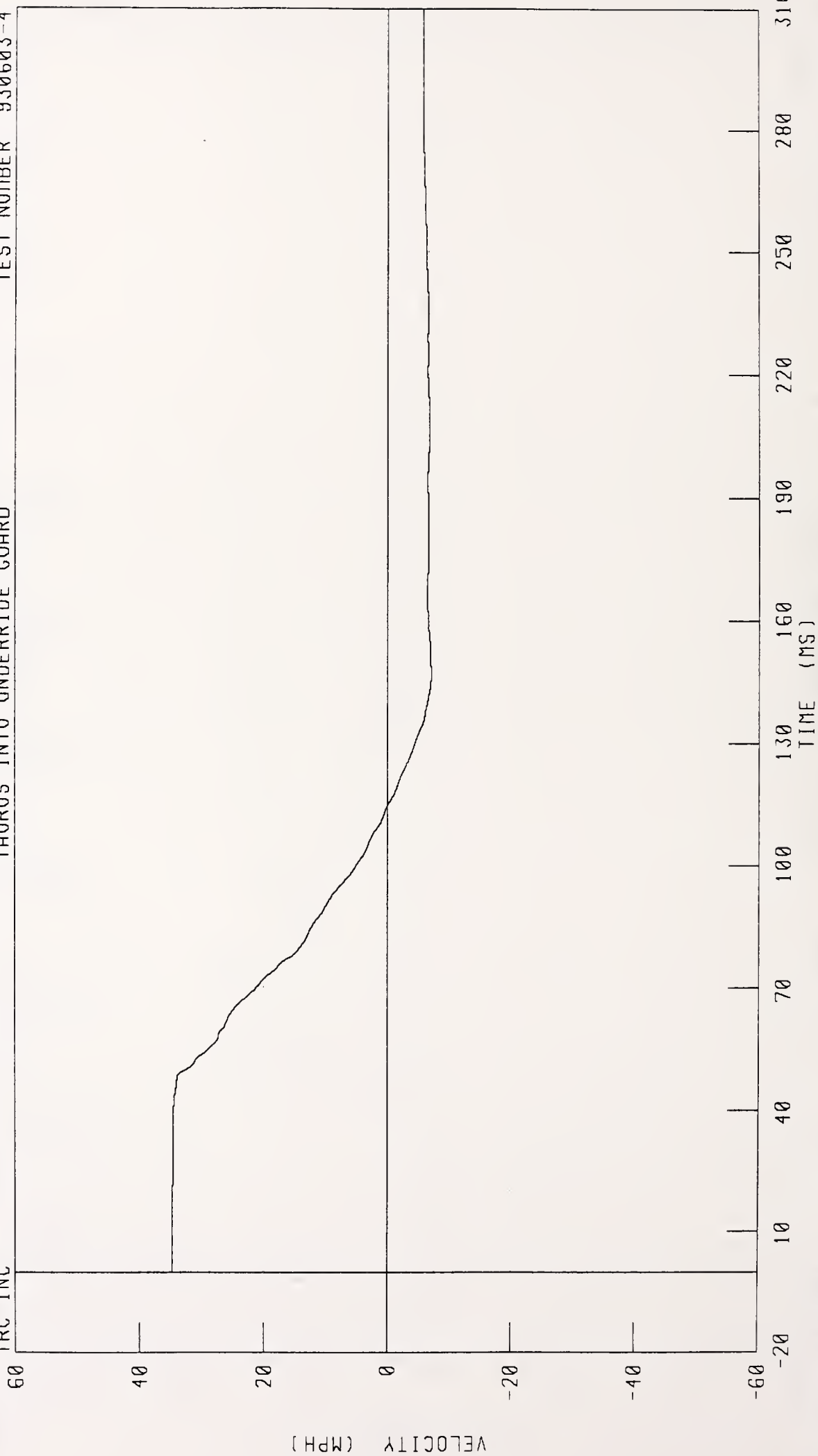
PEAK DATA 2 63 G @ 155 25 MS, -37 46 G @ 76 63 MS

1990 FORD TAURUS INTO RIGID HEAVY TRUCK REAR UNDERRIDE GUARD TEST NO 4

VEHICLE CENTER OF GRAVITY X-AXIS VELOCITY

TAURUS INTO UNDERRIDE GUARD TEST NUMBER 930603-4

TRC INC



CHANNEL VCGXV1 FILTER CH CLASS 180

PEAK DATA 34 70 MPH @ 0 25 MS, -7 06 MPH @ 147 13 MS

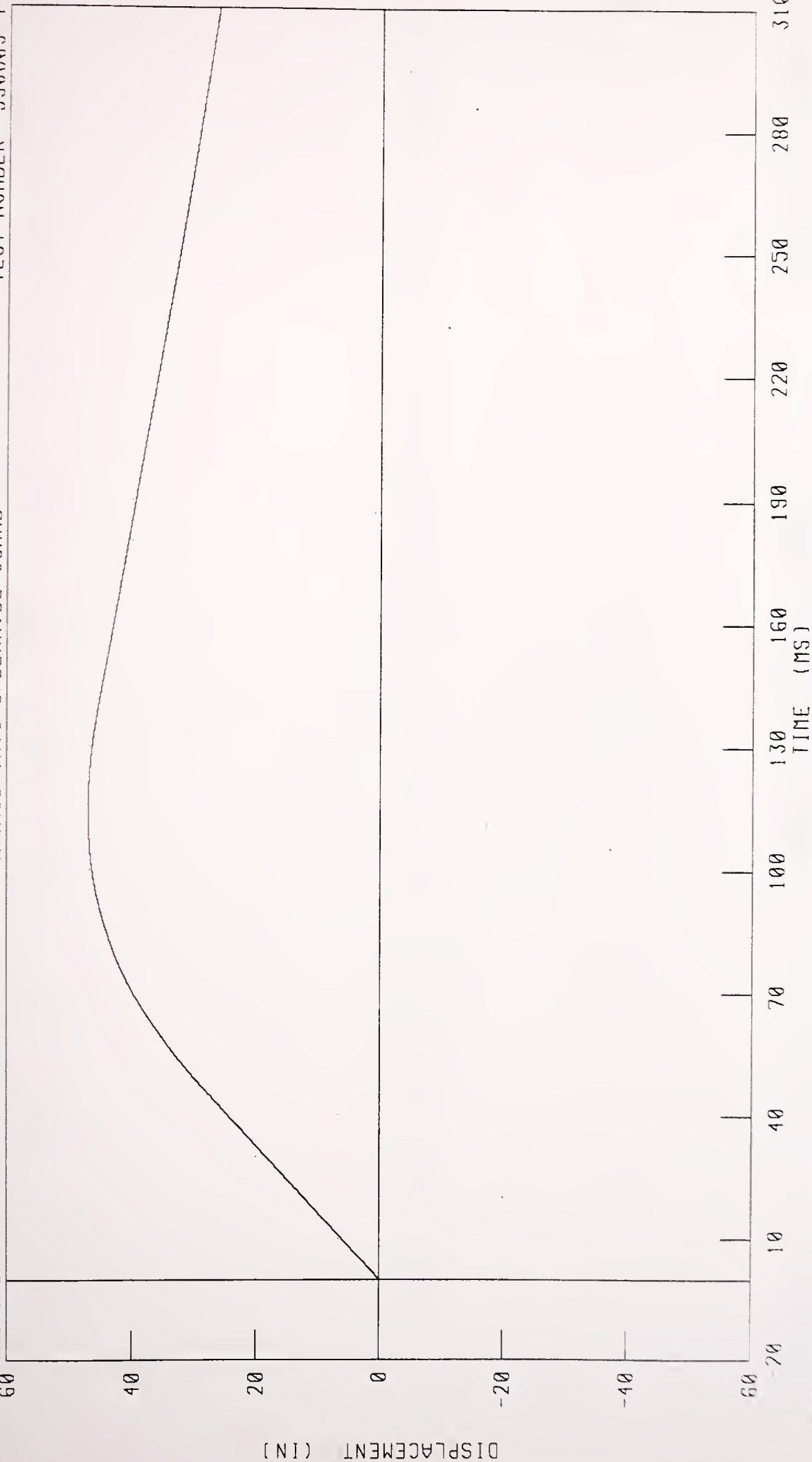


1990 FORD TAURUS INTO RIGID HEAVY TRUCK REAR UNDERRIDE GUARD TEST NO 4  
 VEHICLE CENTER OF GRAVITY X-AXIS DISPLACEMENT

TEST NUMBER 930603-4

TAURUS INTO UNDERRIDE GUARD

TRC INC



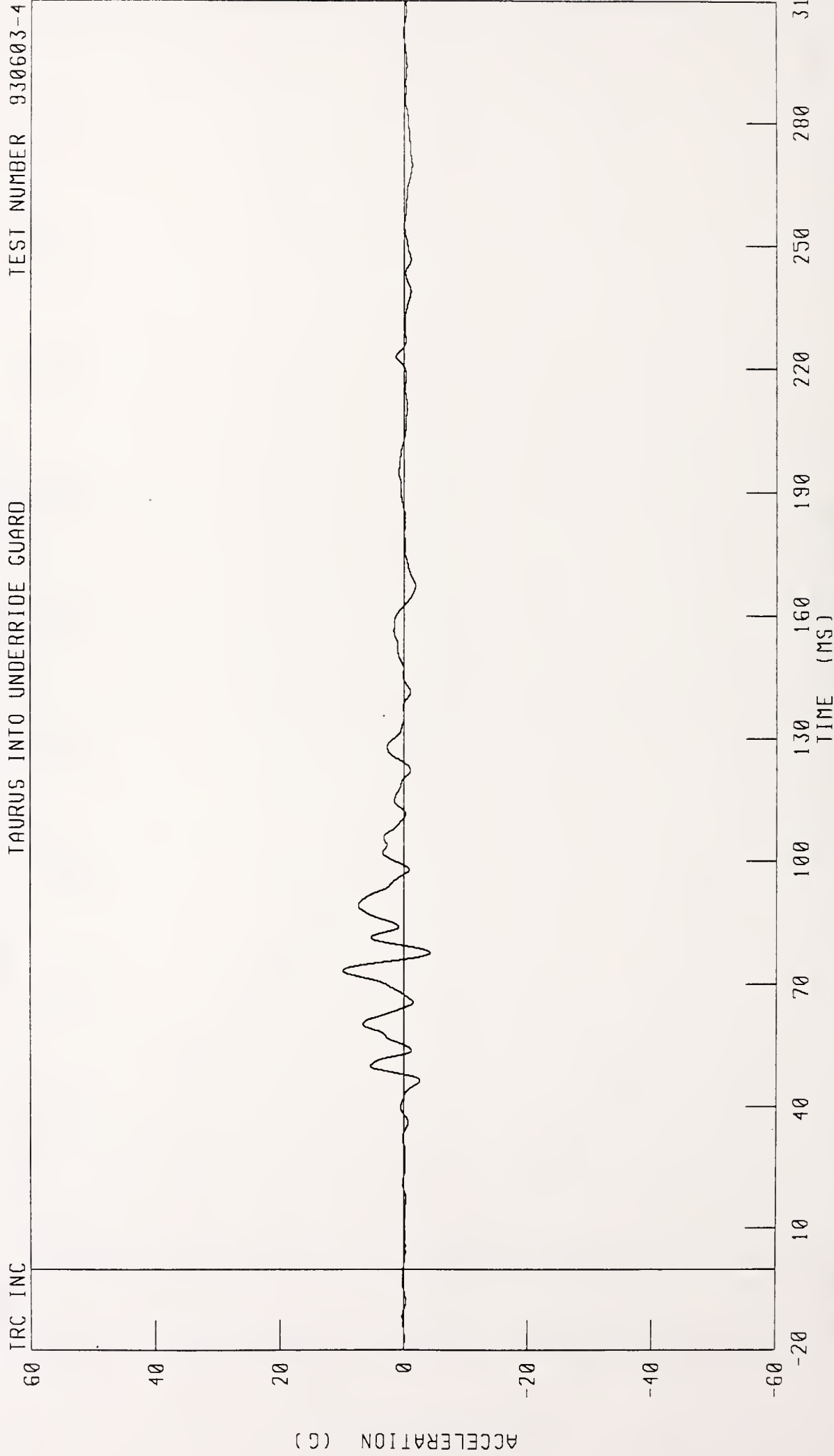
CHANNEL VCGX01 FILTER CH CLASS 180

PEAK DATA 46 97 IN @ 114 63 MS, 0 00 IN @ 0 00 MS

1990 FORD TAURUS INTO RIGID HEAVY TRUCK REAR UNDERRIDE GUARD TEST NO 4

VEHICLE CENTER OF GRAVITY Y-AXIS ACCELERATION

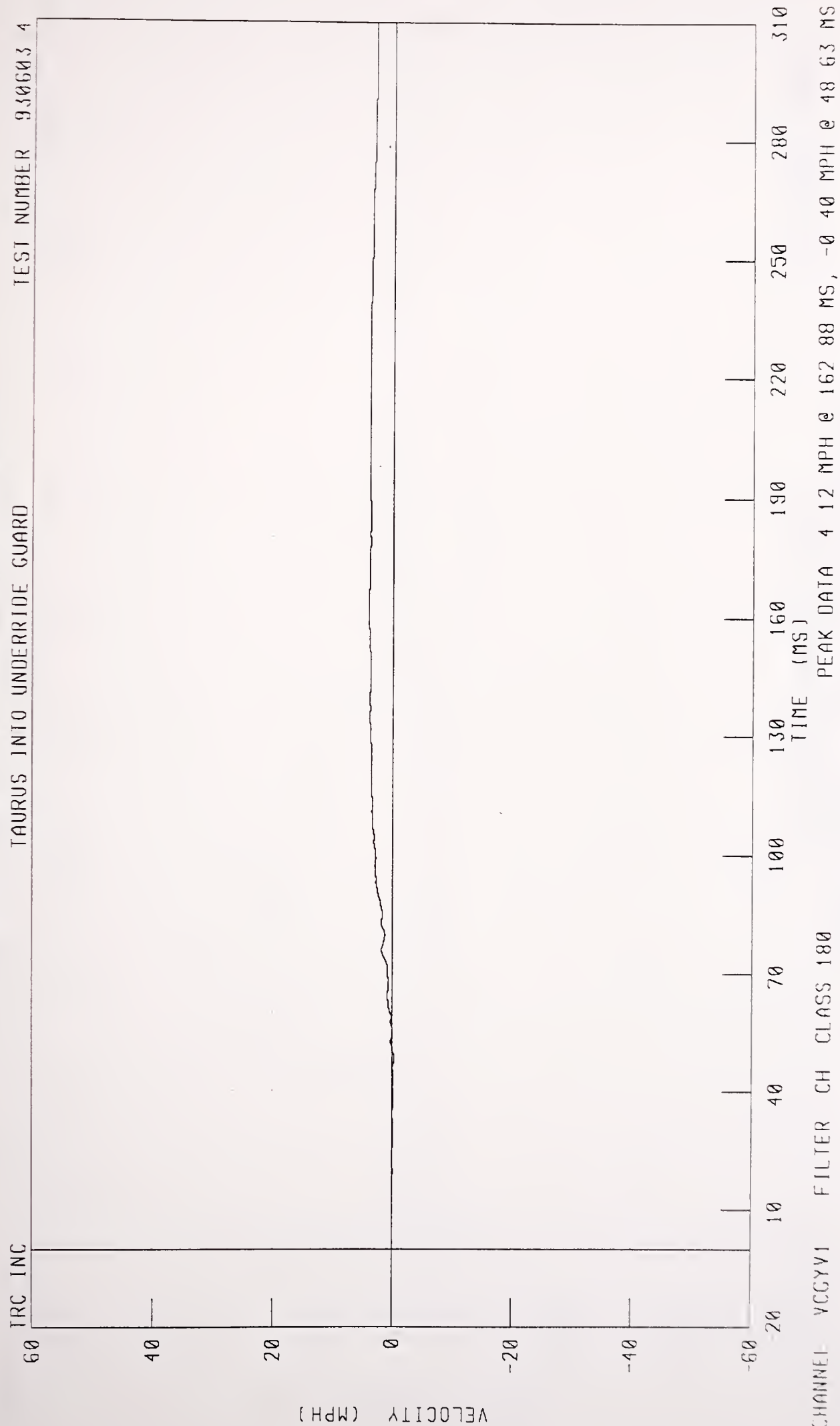
TAURUS INTO UNDERRIDE GUARD TEST NUMBER 930603-4



CHANNEL VCGYG1 FILTER CH CLASS 60

PEAK DATA 9 83 G @ 73 38 MS, -4 25 G @ 77 63 MS

1990 FORD TAURUS INTO RIGID HEAVY TRUCK REAR UNDERRIDE GUARD TEST NO 4  
VEHICLE CENTER OF GRAVITY Y-AXIS VELOCITY

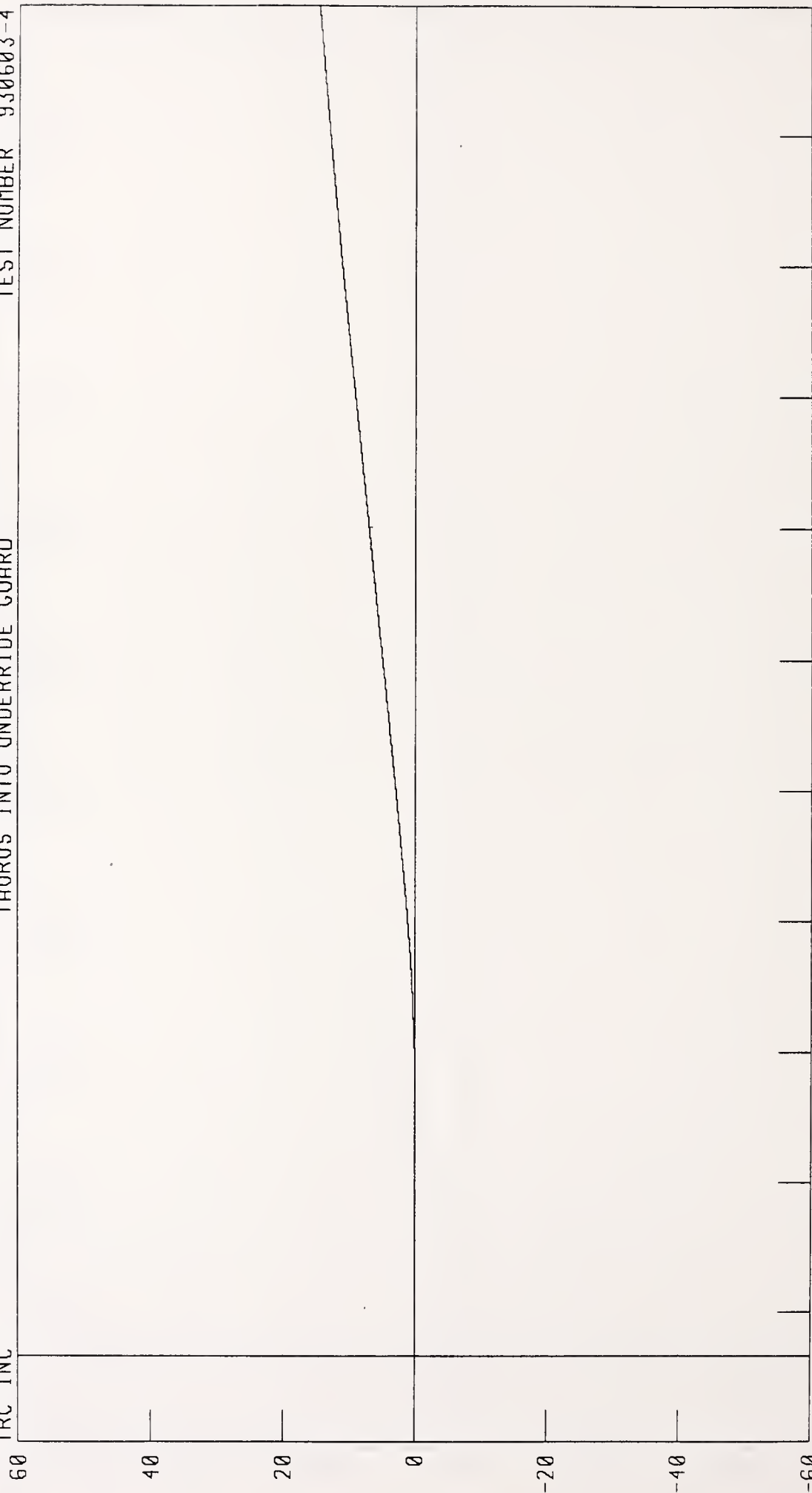


1990 FORD TAURUS INTO RIGID HEAVY TRUCK REAR UNDERRIDE GUARD TEST NO 4

VEHICLE CENTER OF GRAVITY Y-AXIS DISPLACEMENT

TAURUS INTO UNDERRIDE GUARD TEST NUMBER 930603-4

TRC INC



TIME (MS)

PEAK DATA 14 62 IN @ 310 00 MS, -0 07 IN @ 50 00 MS

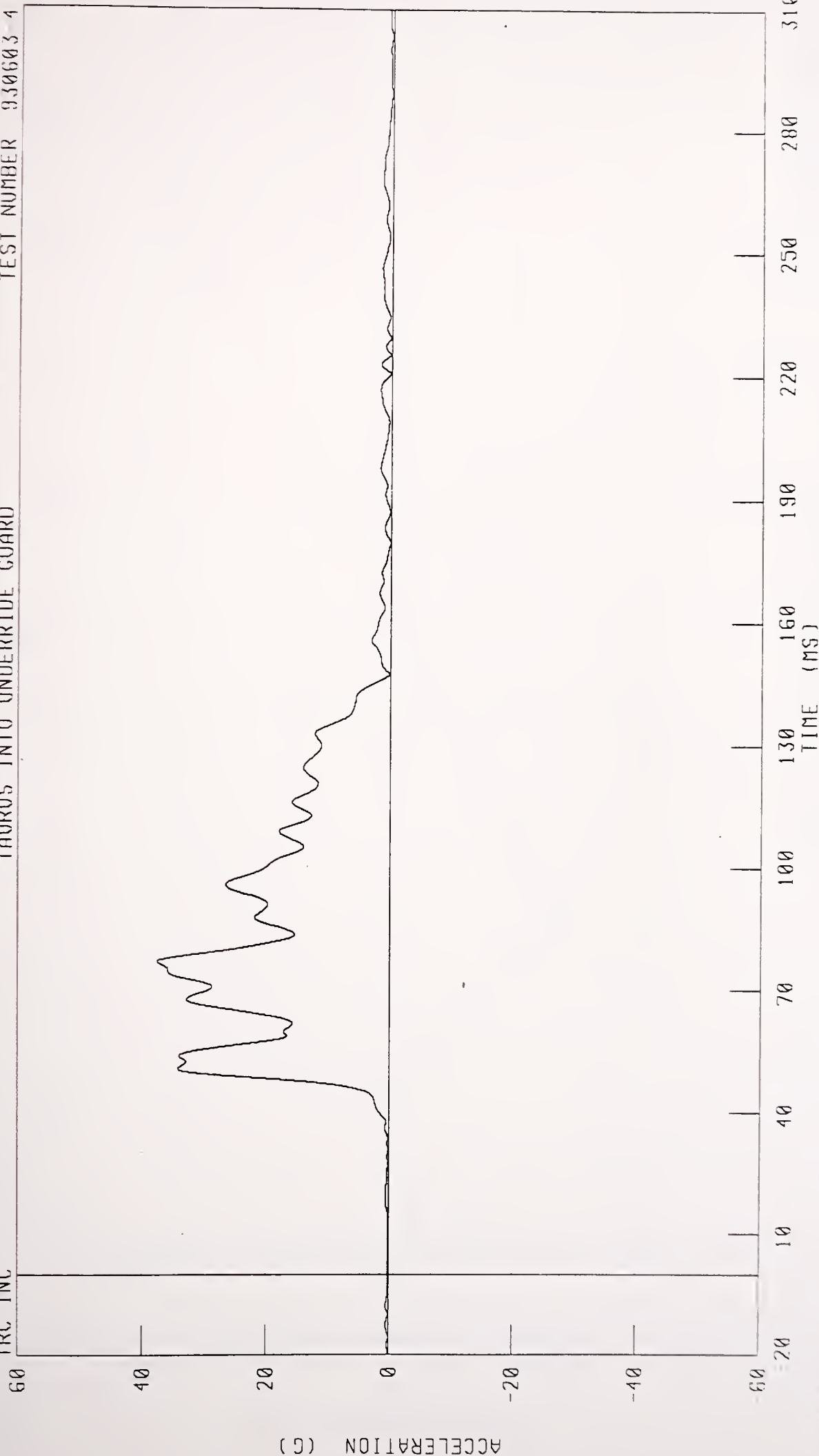
CHANNEL VCCYD1 FILTER CH CLASS 180

1990 FORD TAURUS INTO RIGID HEAVY TRUCK REAR UNDERRIDE GUARD TEST NO 4  
VEHICLE CENTER OF GRAVITY RESULTANT ACCELERATION

TEST NUMBER 930603-4

TAURUS INTO UNDERRIDE GUARD

TRC INC



CHANNEL VCCRC1 FILTER CH CLASS 60

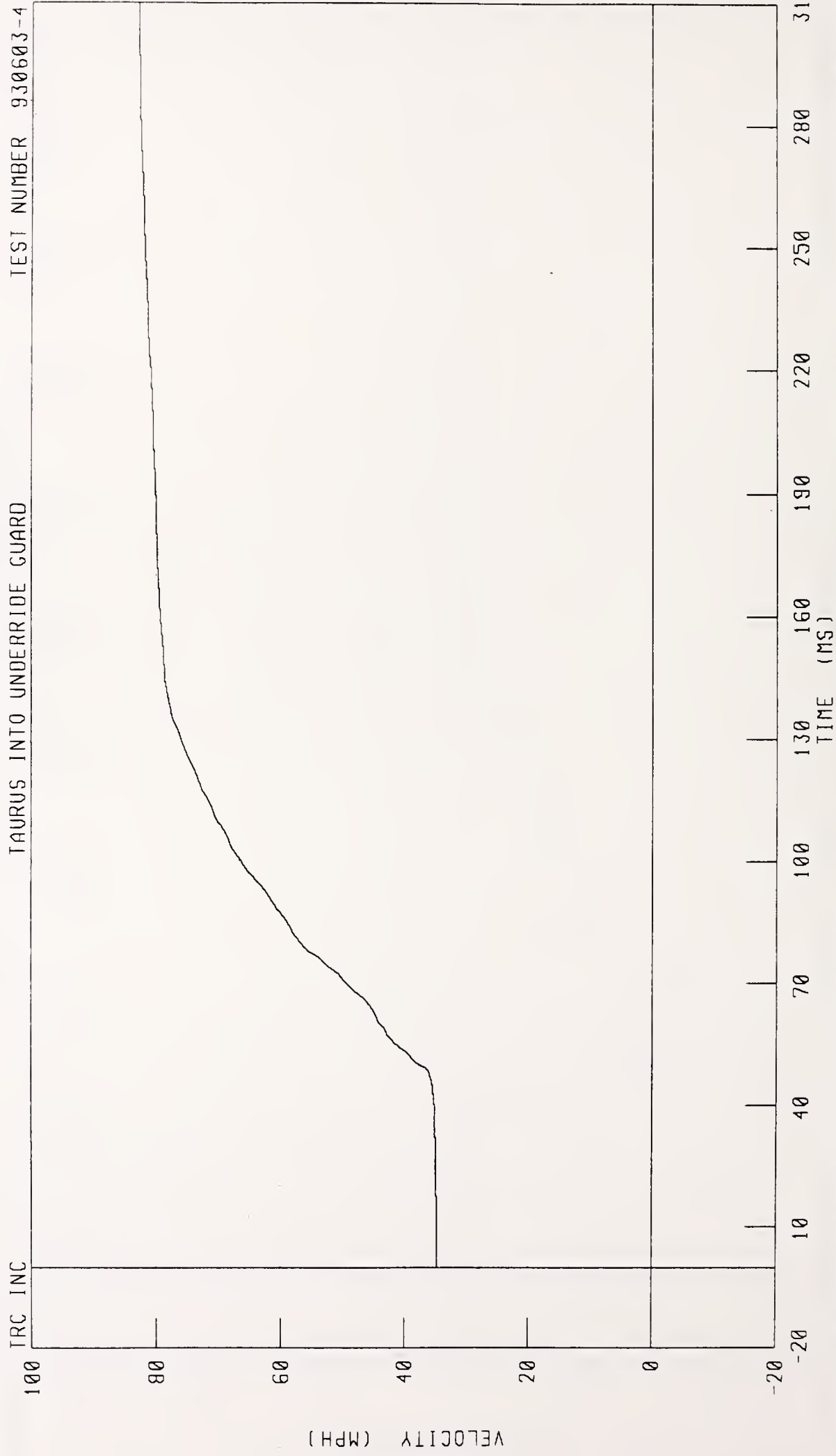
PEAK DATA 37 57 G @ 76 75 MS, 0 03 G @ -10 00 MS



1990 FORD TAURUS INTO RIGID HEAVY TRUCK REAR UNDERRIDE GUARD TEST NO 4

VEHICLE CENTER OF GRAVITY RESULTANT VELOCITY

TAURUS INTO UNDERRIDE GUARD TEST NUMBER 930603-4



CHANNEL VCGRV1 FILTER CH CLASS 180

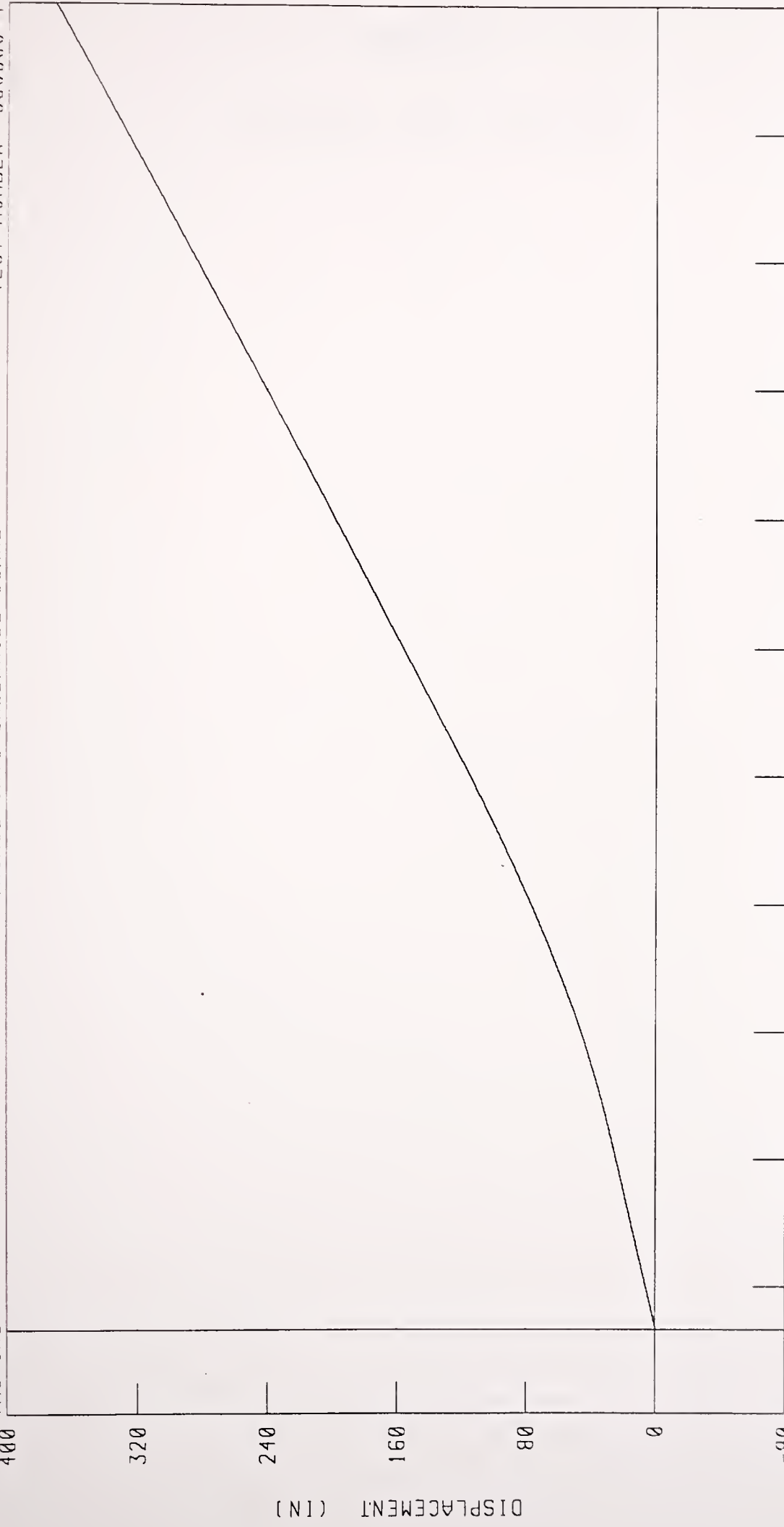
PEAK DATA 82 92 MPH @ 310 00 MS, 34 70 MPH @ 0 00 MS

1990 FORD TAURUS INTO RIGID HEAVY TRUCK REAR UNDERRIDE GUARD TEST NO 4

VEHICLE CENTER OF GRAVITY RESULTANT DISPLACEMENT

TAURUS INTO UNDERRIDE GUARD TEST NUMBER 930603-4

TRC INC



CHANNEL VCGRD1 FILTER CH CLASS 180 PEAK DATA 370 93 IN @ 310 00 MS, 0 00 IN @ 0 00 MS



APPENDIX C

MISCELLANEOUS TEST INFORMATION





VEHICLE ACCELEROMETER INFORMATION

NO.	LOCATION	AXIS	MFR	MODEL	S/N	ORIENTATION (+ SENSING)
1	LEFT REAR SILL	X	ENDEVCO	2264	AR49	FORWARD
	LEFT REAR SILL	Y	ENDEVCO	2264	AS95	LEFT
2	RIGHT REAR SILL	X	ENDEVCO	2264	AY66	FORWARD
	RIGHT REAR SILL	Y	ENDEVCO	2264	AU09	LEFT
3	VEHICLE CENTER OF GRAVITY	X	ENDEVCO	2264	AR38	FORWARD
	VEHICLE CENTER OF GRAVITY	Y	ENDEVCO	2264	AN06	LEFT



## SIGN CONVENTION

ALL DUMMY, BARRIER AND VEHICLE CHANNELS:

+X: FORWARD

+Y: LEFTWARD

+Z: UPWARD

+FORCE: TENSION







DOT LIBRARY



00302594